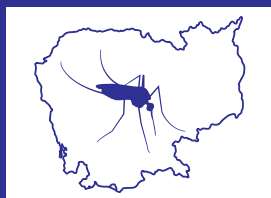


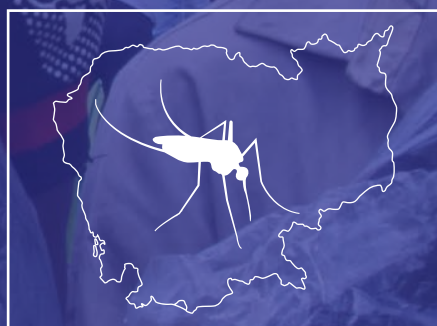
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Cambodia Malaria Elimination Action Framework 2021-2025







Cambodia Malaria Elimination Action Framework 2021-2025

Forward

It is my great honour to present the Malaria Elimination Action Framework (MEAF) 2021 – 2025. This strategy was developed under the leadership of the National Center for Parasitology, Entomology and Malaria Control (CNM) and with support from partners. The Royal Government of Cambodia has a vision to achieve complete elimination of all forms of malaria by 2025. **Samdech Akka Moha Sena Padei Techo Hun Sen, Prime Minister of the Kingdom of Cambodia**, declared this national commitment at the 9th East Asia Summit held in Myanmar in 2014.

The MEAF 2021 – 2025 builds on the previous framework 2016 – 2020 and carries forward the same vision of a malaria free Cambodia. The MEAF 2021 – 2025 was developed through review of progress over the previous five years and careful reflection of the recommendations presented by country partners and external reviewers. The plan also includes the total budget for the associated period together with detailed by micro-plans outlining the methodology and actions that will be led and undertaken by CNM and partners.

CNM has taken impressive steps to build ownership over this strategy as the primary implementer and provider of guidance to supporting. The Ministry of Health (MOH) Cambodia therefore seeks continued leadership from CNM and renewed commitment of all the involved partners for the implementation of MEAF 2021 – 2025. The MOH strongly requests that all partners within the Royal Government and development partners work together to implement the MEAF 2021 – 2025 Plan as key strategy and planning tool for effective implementation of elimination-focused malaria program.

The MOH Cambodia looks forward to continued partnership to ensure a Cambodia free from malaria.

Phnom Penh,

The Minister of Health



Prof. MAM BUNHENG

Preface

Cambodia has strengthened its commitment to eliminating malaria during the previous 5 years and has made significant progress towards the goals outlined in the National Strategic Plan for Elimination of Malaria in the Kingdom of Cambodia, 2011 – 2025, as endorsed by **Samdech Akka Moha Sena Padei Techo Hun Sen, Prime Minister of the Kingdom of Cambodia**. The Malaria Elimination Action Framework (MEAF) 2021 – 2025 is an amendment to the original strategy and includes new strategic priorities to address the current and projected epidemiological and programmatic realities. The Malaria Elimination Action Framework 2021 – 2025 was developed primarily by the National Centre for Parasitology, Entomology and Malaria Control (CNM), with support from the World Health Organization (WHO), Clinton Health Access Initiative (CHAI) and other technical partners (as described in Annex 1). Consultations with sub national health officers, Ministry stakeholders and implementing partners took place between August – December 2019 to generate consensus on strategic approaches. Beyond consultation with local stakeholders, this document is based on guidance from the Malaria Elimination in the Greater Mekong Subregion 2015 – 2030 and is aligned with the principles of the WHO Global Technical Strategy (GTS) for malaria 2016 – 2030.

The MEAF 2021 – 2025 incorporates the findings from the 2019 Malaria Program Review together with recommendations from national and international experts in malaria control and elimination.

- ***P. falciparum*** is now at historically low levels and is primarily confined to difficult to reach forest areas, which will require innovative, targeted expansion of outreach services to forest goers and mobile migrant populations (MMP) at risk.
- As malaria cases continue to decrease, the program will need to remain committed to high levels of testing and begin the process of integrating village malaria workers (VMWs) into broader community health platforms.
- ***P. vivax*** is now the dominant malaria species and will require the rollout of safe radical cure to eliminate the dormant liver stage malaria parasites from the >80 percent of all *P. vivax* cases that are thought to be due to relapse.
- The threat of artemisinin combination therapy (ACT) resistant malaria requires the country to remain vigilant and sustain strong surveillance to detect, rapidly investigate and respond to all malaria cases including follow-up to detect possible resistance and treatment failure.

The successful implementation of Cambodia's Malaria Elimination Action Framework 2021 – 2025 will accelerate malaria elimination as well as contribute to regional objectives to interrupt transmission of ***P. falciparum*** in areas of multidrug resistance, in all areas of the GMS by 2025.

Director, CNM

Dr. HUY REKOL

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Acknowledgements

The Malaria Elimination Action Framework (MEAF), 2021 – 2025, was developed between August – December 2019 by the National Center for Parasitology, Entomology and Malaria Control (CNM). This framework was constructed through numerous consultations within CNM along with malaria focal points from the provincial and district health departments, other departments with the Ministry of Health, and technical, implementing, and financial partners.

The MEAF development process was overseen by CNM Director, **Dr. Huy Rekol**; Deputy Director, **Dr. Lek Dysoley**, and Chief of Technical Bureau, **Dr. Siv Sovannaroth**. Inputs on strategy formulation, microplanning, monitoring and evaluation, and costing of the framework were also provided by other senior management staff and representatives of various programs and units at CNM: including **Dr. Chea Nguon** (Deputy Director), **Dr. Chea Huch** (Deputy Director), **Dr. Tho Sochantha** (Deputy Director), **Dr. Boukheng Thavrin** (Deputy Director), **Dr. Meas Tha** (Deputy Director), **Mr. Chea Sokun** (Vector Control), **Ms. Mao Sokny** (Entomology), **Dr. Saing Sam Ath**, **Mr. Man Somnang** and **Mrs. Nhem Sina** (Laboratory), **Dr. Sophanaroth Srey** (M&E), **Dr. Kim Sour Ly** (Surveillance), and **Dr. Seng Rothpisey** (Health Education), **Dr. Po Ly** (VMWs and PPM), **Dr. Tol Bunkea** (Epidemiology), **Mr. Ngor Pengby** (Data Management), **Mr. Ouk Rada** (Pharmacy), **Mrs. Ngau Vanthon** (Procurement) and **Mr. Sar Heang** (Finance). Other CNM staff also contributed to the writing of the **MEAF** and completion of the costing.

Technical and financial support for development of the **MEAF** was provided by **WHO** and **CHAI**. Partners including Population Services International (**PSI**), Malaria Consortium (**MC**), **CARE**, Catholic Relief Services (**CRS**), Partners for Development (**PfD**), University Research Co. (**URC**), Health Poverty Action (**HPA**) and United Nations Office for Project Services (**UNOPS**), and others also contributed to the strategy development process.

Additional feedback on the MEAF was provided by the Bill & Melinda Gates Foundation (**BMGF**) and technical officers from The United States Agency for International Development (**USAID**) and the President's Malaria Initiative (**PMI**).

The Ministry of Health (**MOH**) hereby expresses its sincere appreciation for all contributions to the completion of MEAF, **2021 – 2025**.



Acronyms and Abbreviations

ACD	Active Case Detection	MMP	Mobile and migrant population
ACT	Artemisinin-based combination therapy	MMW	Mobile Malaria Worker
API	Annual Parasite Incidence	MoH	Ministry of Health
APLMA	Asia Pacific Leaders Malaria Alliance	NTG	National Treatment Guidelines
APMEN	The Asia Pacific Malaria Elimination Network	OD	Operational District
ASMQ	Artesunate-Mefloquine	PCD	Passive Case Detection
BMGF	Bill & Melinda Gates Foundation	PH	Provincial Hospital
CMS	Central Medical Store	PHD	Provincial Health Department
CNM	National Centre for Parasitology, Entomology and Malaria Control	PMI	President's Malaria Initiative
DDF	Department of Drug and Food	PPM	Public-Private Mix
DHA-PPQ	Dihydroartemisinin Piperaquine	PSM	Procurement and Supply Chain Management
GFATM	The Global Fund to Fight AIDS, Tuberculosis and Malaria	QA	Quality Assurance
GMS	Greater Mekong Subregion	QC	Quality Control
HC	Health Center	RAI	Regional Artemisinin Initiative
iDES	Integrated drug efficacy surveillance	RCAF	Royal Cambodian Armed Forces
IEC/BCC	Information education communication and behavioral change communication	RDT	Rapid Diagnostic Test
IP	Intensification Plan	RH	Referral Hospital
IRS	Indoor Residual Spraying	TACT	Triple Artemisinin-Based Combination Therapy
ITN	Insecticide-Treated Net	TES	Therapeutic Efficacy Studies
LLIN	Long-lasting Insecticidal Net	UNOPS	United Nations Office for Project Services
LLIHN	Long-lasting Insecticidal Hammock Net	VHSG	Village Health Support Group
MEAF	Malaria Elimination Action Framework	VMWs	Village Malaria Workers
MDR	Multidrug Resistance	WHO	World Health Organization
MIS	Malaria Information System		





Strategy at a Glance

As the Kingdom of Cambodia strives to achieve the goal of elimination of all forms of malaria by 2025, efforts will be coordinated and intensified achieve this goal. The strategy of the next five years for malaria elimination focuses on three objective pillars and a cross-cutting section on strengthening the enabling environment. Each of these four main sections are further broken down into strategies, activities, and sub activities to create a comprehensive workplan to elimination.

Objective 1: Early Detect, and effectively and safely treat 100% of cases, and provide effective personal protection to at least 90% of the high-risk population

First, Objective 1 focuses on the importance of providing a comprehensive package of core interventions to halt transmission of Plasmodium. Timely diagnosis and appropriate treatment are critical, particularly in the content of artemisinin resistance. The strategic deployment of the village malaria worker (VMW) network will ensure that even the hard-to-reach and mobile population will receive prompt diagnostic and treatment with qualified drugs. The hospitals and testing labs in the country will be ensured to be qualified to provide malaria services. In addition, the program will ensure to provide personal protection from vectors to the at-risk population through mass and continuous distributions of long lasting insecticide treated nets and hammock nets (LLIN/LLIHN). During the 2021 – 2025 period, the potential of new vector control and case management tools will be explored as evidence becomes available. To engage and raise awareness, IEC/BCC will be continually updated and targeted towards affected groups.

Objective 2: Intensify focal interventions to interrupt transmission in endemic locations with highest risk (including mobile migrant population / forest goers) to reach API less than 0.1 for Plasmodium falciparum by 2020 and all species by 2025

While prior strategies have been successful in decreasing malaria morbidity and mortality for the general population, Objective 2 highlights the attention to increased and innovative efforts to target the highest risk areas and populations. Mobile and migrant populations are the focus of this elimination plan, and hotspots must be quickly located and newer strategies deployed to interrupt transmission. Intensifying the mobile malaria worker network by having them provide at-risk populations with access to quality case management services, through both passive and active case detection, will ensure that the parasite reservoir is depleted promptly and sustainably. Increased efforts will also be made for monitoring, mentoring, and supervision in these areas as well as a high-level commitment with the local authorities. Awareness campaigns and distribution of personal protection and vector control tools will further empower the mobile and migrant population to reduce their risk of malaria and report symptoms immediately.



Objective 3: Investigate, clear, document and follow up 100% of cases and foci to interrupt transmission and prevent re-establishment

After identifying cases, ensuring appropriate reporting, investigation, and response to transmission areas is imperative to halting the epidemic. Strategies developed for this plan are to ensure complete and accurate reporting. In particular, all confirmed cases will be notified, investigated, and classified in a timely manner to coordinate an appropriate response. Any potential new foci being investigated within one weeks followed by a targeted response to stop transmission. In this manner, outbreaks should also be detected and responded to within one week. Adequately trained staff at all levels is needed to properly organize and optimize usage of the data available. Lastly, the MIS should be expanded and utilized to its full potential to assist in this data management and analysis.

Enabling Environment: Strengthening program leadership to maintain effective program management and coordination at central and provincial levels and harness innovation and research

Lastly, to optimize national malaria responses, an overall strengthening of health systems and improvement in the enabling environment serve as crucial foundations for success. The Enabling Environment objective underscores all objectives by promoting a comprehensive program capable of performing all the required programmatic activities and an environment which allows coordinated implementation. Activities will encompass all levels from international communities and donors, regional partners and neighboring countries, the national malaria control program, and the provincial and local levels. Leadership, human resources, financial management, procurement and supply chain, and research are considered as critical components. As Cambodia plans to declare itself malaria- free and transition away from vertically-funded programs, efforts will see to effective integration of the malaria program into the larger health system.





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1/COUNTRY
Profile



គម្រោងថ្នាក់ដោយ
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1. Country Profile

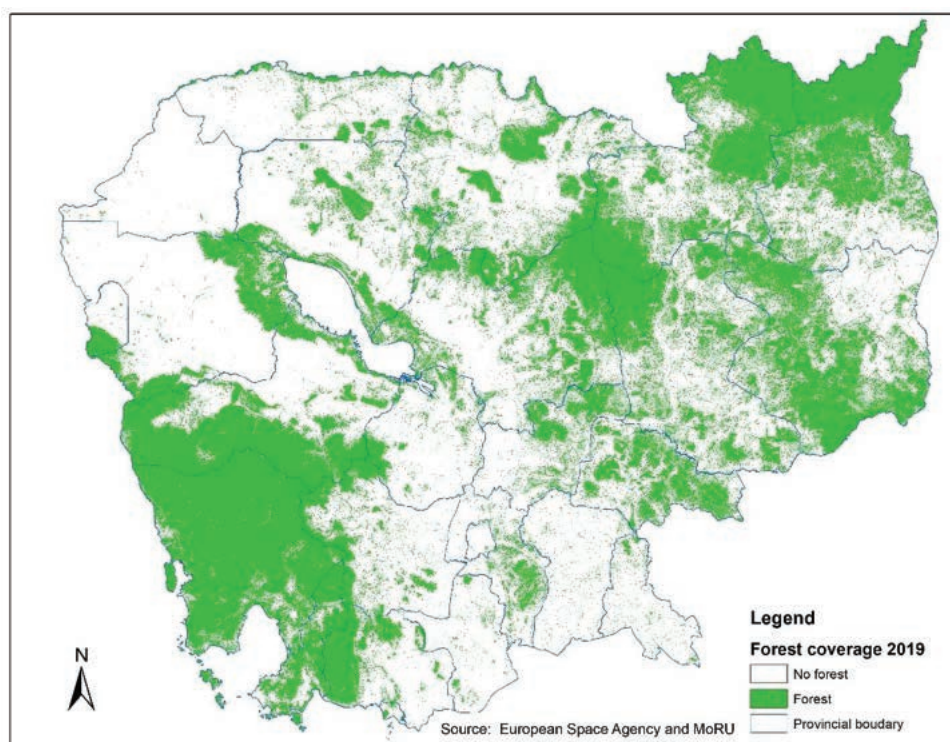
1.1 Geography

Cambodia is located in the Greater Mekong Subregion of Southeast Asia on the Indochina Peninsula. It has a land area of about 181,035 km¹ and shares borders with Thailand, Laos, and Vietnam.

Defining features of Cambodia include the Tonle Sap Lake and River and Mekong River which snake through the country with low-lying lands and form the central plains. The plateau region and mountain ranges surround and are located more on the edge of the country and a coastal region sits along the Gulf of Thailand. The year can be generally divided into a rainy season (June to October) and a dry season (November to April); malaria cases are perennial and peak during the rainy season.

Forest covers the north east and south western regions of the country as shown in Figure 1.

Figure 1: Forest cover in 2019²



¹ Land and Resource of Cambodia. Ministry of Rural Development, 2009

² European Space Agency (ESA) and MORU Mahidol Oxford Tropical Medicine Research Unit, 2019

1.2 Demographics

The population of Cambodia is approximately 15.3 million³. There has been steady population growth in the past decade at 1.2% per year, reflecting the country's growth in commerce, economy, and services. The plateau and mountain regions remain the least densely populated, with only 29 persons per square kilometer.

Cambodia is divided into 25 cities/ provinces including one municipality (Phnom Penh), as shown in Figure 1. Each province is divided into districts (srok), and each district into communes (khum). In addition, there are a group of villages (phum). Each municipality is divided into sections (khan), each section into quarters (sangkat).

Figure 2: Map of Cambodia showing 25 provinces, including 1 municipality



Migrant workers in Cambodia totaled 78,649 persons in 2019, majority of whom are from neighboring Vietnam and Thailand, with median age of 35 years old and 54% of male⁴. The Region shows a primary clear pattern of migration characterized by population movements from Myanmar, Cambodia and Lao People's Democratic Republic to Thailand. Also, secondary migration flows occur, including population movements from Myanmar, Lao People's Democratic Republic and Vietnam to the border provinces of China PRC or cross-border mobility between Cambodia and Vietnam⁵. Mobile and migrant populations,

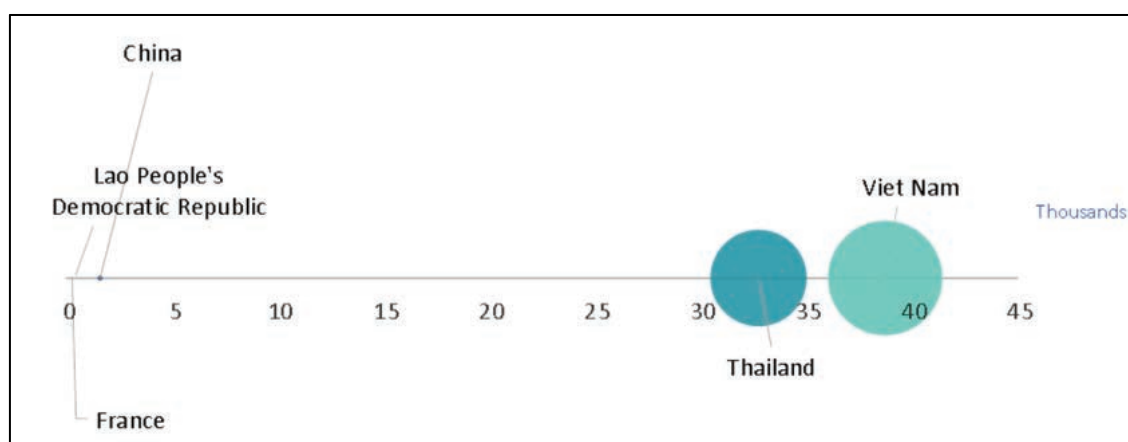
³ Ministry of Planning Report: General Population Census ²⁰¹⁹: Provisional Population Totals, excluding migrants working abroad

⁴ United Nations, Department of Economic and Social Affairs, ²⁰¹⁹ Migration Profile: Cambodia.

⁵ Population mobility and malaria. New Delhi: World Health Organization, Regional Office for South-East Asia; 2017

which reside in areas for up to a year at a time, contribute to sustaining malaria transmission in Cambodia, among these forest workers/goers have been identified as the highest risk group for malaria⁶.

Table 1: Number of international migrants in Cambodia by top countries of origin (2019)⁷



1.3 Socioeconomic Context

Recently Cambodia has been experiencing strong economic growth, with sustained annual growth of gross domestic product (GDP) averaging 8% per year since 1998⁸. Garment exports and tourism have driven recent growth, and in 2015 Cambodia reached lower middle-income status. In 2018, the per capita gross national income (GNI) was \$1380. Concurrently, the poverty rate has fallen drastically, from 48% in 2007 to 14% in 2014. However, 90% of the poor reside in the rural areas, and almost 5 million people are considered near-poor and vulnerable.

1.4 Cambodian Health System

In Cambodia, the Ministry of Health (MOH) is principally responsible for health care and the health system. The country is broadly divided into 24 provincial health departments (PHD, which each have one provincial hospital) and one municipality (Phnom Penh, with 9 national hospitals). These are further subdivided into 101 operational districts (OD), governed by their respective PHD or municipality. An OD has a referral hospital (RH) and multiple health centers and health posts, which in total provides services for the populations of around 100,000-200,000 people.

Recently, health expenditure has been 6.1% of the national GDP⁹. Health expenditure per capita has increased substantially in the past decade, from \$33 in 2006 to \$78 in 2016.

1.5 National Malaria Program

The National Centre for Parasitology, Entomology, and Malaria Control (CNM) houses the national malaria program, which is the largest disease-specific program. CNM includes units in charge of specific areas of

⁶ Mobile & Migrant Population in the context of Malaria Elimination, Operational Manual, 2018

⁷ United Nations, Department of Economic and Social Affairs, 2019 Migration Profile: Cambodia.

⁸ World Bank Country Overview: Cambodia. www.worldbank.org/en/country/cambodia/overview

⁹ World Bank Indicators. databank.worldbank.org/source/world-development-indicators



support such as epidemiology, entomology, research, vector control, monitoring & evaluation, the procurement, laboratory, health education, information technology, public private mix, and village malaria workers. Their work is supported by the Technical Bureau, the Administration Bureau handling personnel and logistics, as well as the Finance Bureau.

The CNM has been largely supported by the Global Fund to fight AIDS, Tuberculosis, and Malaria (GFATM) since 2004, and increased support is provided through the Regional Artemisinin Initiative (RAI, 2014-2017) and the RAI Elimination (RAI2E 2018-2020, RAI3E 2021-2023) grants¹⁰, with an objective to accelerate efforts and eliminate *P. falciparum* malaria by 2020 and all malaria species by 2025. Approximately 60% of funding for programmatic activities and implementation is supported by the GFATM grants, with other technical partner funding and government contributions supporting the remaining needs. Since 2012, the President's Malaria Initiative (PMI) engages donors to coordinate activities to support CNM's activities towards control and elimination¹¹. The Bill & Melinda Gates Foundation have also significantly contributed since 2009 for technical assistance on areas including the surveillance system, financial and program management, and operational research. During the RAI2E implementation period, the GFATM utilized the United Nations Office for Project Services (UNOPS) as principle recipient (PR) in Cambodia, with CNM as a government implementing partner and 4 CSO subrecipients (that include Care International, Catholic Relief Services, Malaria Consortium and PSI Consortium) who provide direct technical support throughout the country.

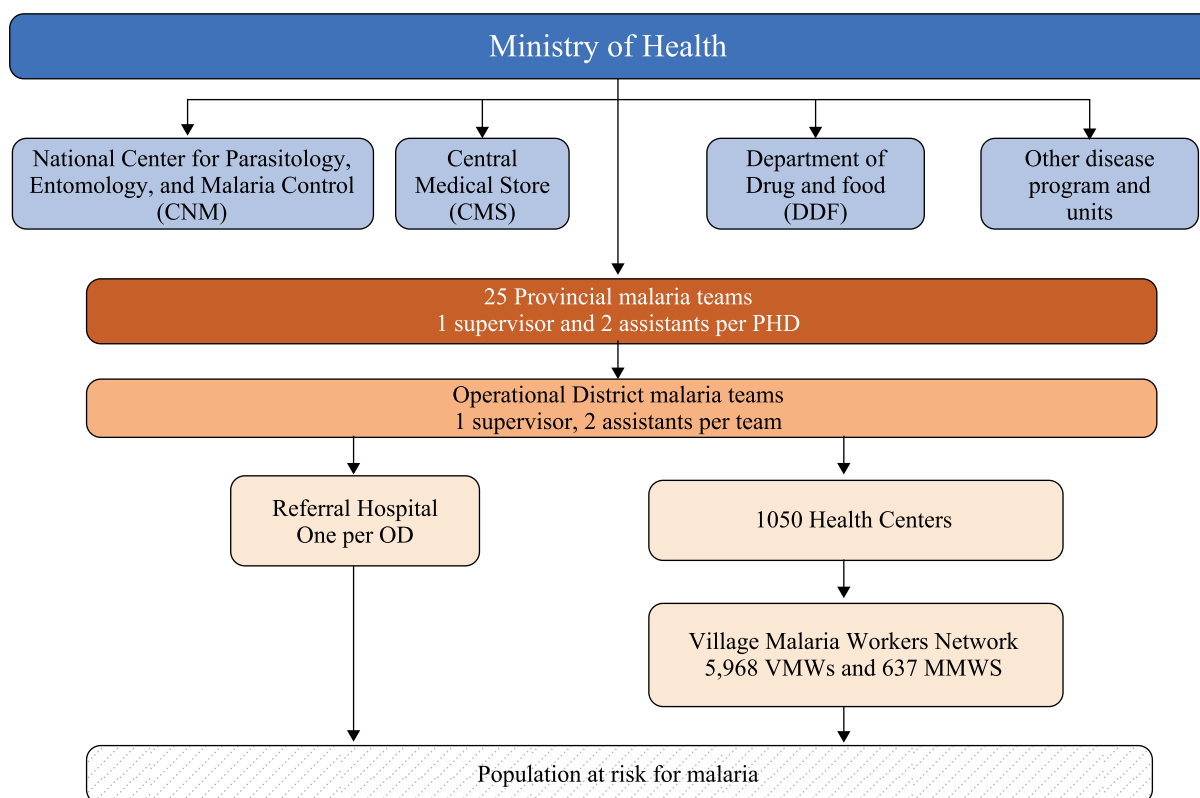
While the national malaria program was initially implemented vertically, it has progressively become more decentralized and integrated into the existing public health system. Staff at the PHD and OD levels are responsible for supervising and providing management oversight of health facilities that provide testing and treatment services and that perform activities related to surveillance, vector control, and IEC/BCC. PHD and OD staff are also critical in ensuring quality of MIS data and using data for decision making.

CNM has also recruited a large network of village malaria workers (VMWs) and mobile malaria workers (MMWs) available to support malaria elimination. As of October 2019, there were total of 5,968 VMWs active in 2,984 VMW villages (API > 5) and 637 MMWs in 318 forest sites -in Cambodia who provide diagnosis and treatment services and submit real-time reports using mobile phones. VMWs and MMWs attend monthly meetings at health centers to review data reports, re-supply testing and treatment supplies, and conduct skills building sessions. Mobile malaria workers conduct active case detection in hard to reach areas near the forest and among MMPs twice per month in addition to working extended hours to serve those mobile populations who pass by them going to and from the forest.

¹⁰ RAI Grants: About Us. <https://raifund.org/about-us>

¹¹ President's Malaria Initiative, Country Profile: Cambodia pmi.gov/resource-library/country-profiles

Figure 3: National malaria program structure in Cambodia





2/ MALARIA

Situational Analysis



2. Malaria Situational Analysis

2.1 History of Malaria Control

Cambodia began interventions for malaria control in the 1950s, as part of the Global Malaria Eradication Campaign, which included a large indoor residual spraying (IRS) campaign and scale up of case management services¹². By the early 1960s, malaria prevalence rates had dramatically reduced from 60% to 1%. A civil war and genocide severely disrupted the country from 1975 – 1978 which claimed 2 million or more lives, and malaria control activities ceased. Once Cambodia had stabilized, in 1984 the Ministry of Health was founded and designated National Malaria Control as a disease program for malaria support, which was later integrated into the national public health system as the National Centre for Parasitology, Entomology and Malaria Control.

Artemisinin-based combination therapies (ACTs) were introduced in 2001 at a national scale, and with support from the Bill & Melinda Gates Foundation, WHO, and later by GFATM, other interventions like insecticide-treated bednets were introduced. CNM began the Village Malaria Worker (VMW) program in 2004, and five-years later this was expanded to more at-risk villages. Artemisinin resistance was confirmed in 2008 in Cambodia which stimulated an increased need and response to control malaria including case management and long-lasting impregnated nets (LLIN) and hammocks nets (LLIHN). In 2011, the National Strategy for Malaria Elimination (NSP 2011 – 2025) was signed by the Prime Minister, setting the ambitious goal of achieving malaria elimination in Cambodia by 2025.

In 2016, the Cambodia Malaria Elimination Action Framework 2016 – 2020 was published and disseminated, acting as a unified document for a detailed comprehensive strategy to eliminate malaria from the country. This document reflects the national commitment to end *Plasmodium falciparum* malaria by 2020 and *Plasmodium vivax* malaria by 2025, aligning with goals for Cambodia set forth in the strategy set forward by the WHO for the Greater Mekong Subregion¹³. This commitment by the Cambodian Ministry of Health was reinforced among leaders at the Asia Pacific Leaders Malaria Alliance in November 2015 when the APLMA Malaria Elimination Roadmap¹⁴. The roadmap endorsed with a goal of rapid and sustained scale-up towards the entire region being malaria-free by 2030, including by 2025 in Cambodia.

¹² Sovannarith Siv, et al. *Plasmodium vivax* Malaria in Cambodia. Am J Trop Med Hyg. 2016

¹³ WHO, Strategy for Malaria Elimination in the Greater Mekong Subregion (2015-2030), 2015

¹⁴ Asia Pacific Leaders Malaria Alliance Roadmap, aplma.org, 2015

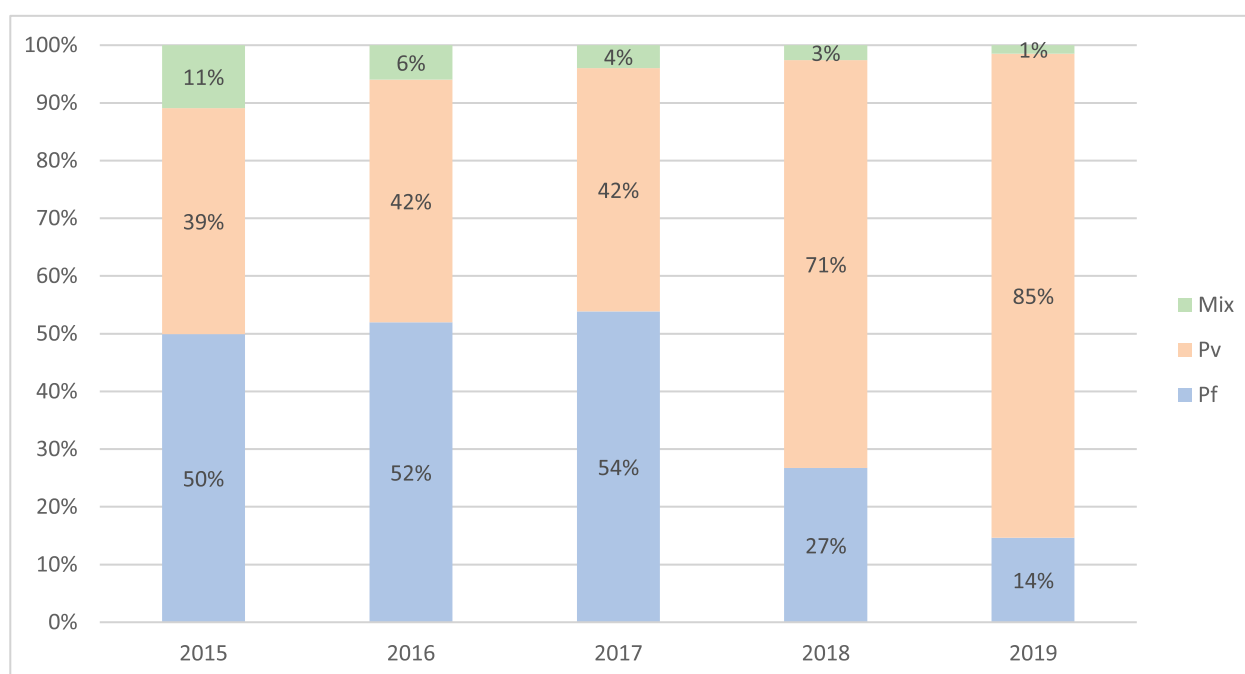


2.2 Epidemiological Profile

2.2.1 Parasites

Malaria cases in Cambodia are caused by *Plasmodium falciparum*, *Plasmodium vivax*, or a mix of both strains. Recent years have focused on the *elimination of Plasmodium falciparum* based on its higher morbidity/mortality and the risk of spreading artemisinin resistance; its absolute and relative incidence has fallen dramatically in 2019 with the Intensification Plan. Early data from 2019 show only 15% of malaria cases had *P. falciparum* (14% solely *P. falciparum*, 1% mix), whereas in 2015 these represented 50% of cases¹⁵. Conversely, *P. vivax* has not experienced the same declines and is now the dominant species, highlighting the need to scale up access to safe radical cure which began piloting recently in late 2019.

Figure 4: Malaria cases, proportion of species per year, 2015-2019¹⁶



2.2.2 Vectors

There is a large diversity in malaria vectors with more than 25 species identified in Cambodia¹⁷. The main vectors are members of the *An. dirus s.l.* and *An. minimus s.l.* species complexes¹⁸. *An. dirus* is by far the most efficient malaria vector in the GMS; however, with a distribution closely linked to dense forest cover,

¹⁵ Malaria Information System data

¹⁶ Malaria Information System data

¹⁷ Sovannarith Siv, et al. *Plasmodium vivax* Malaria in Cambodia. Am J Trop Med Hyg. 2016

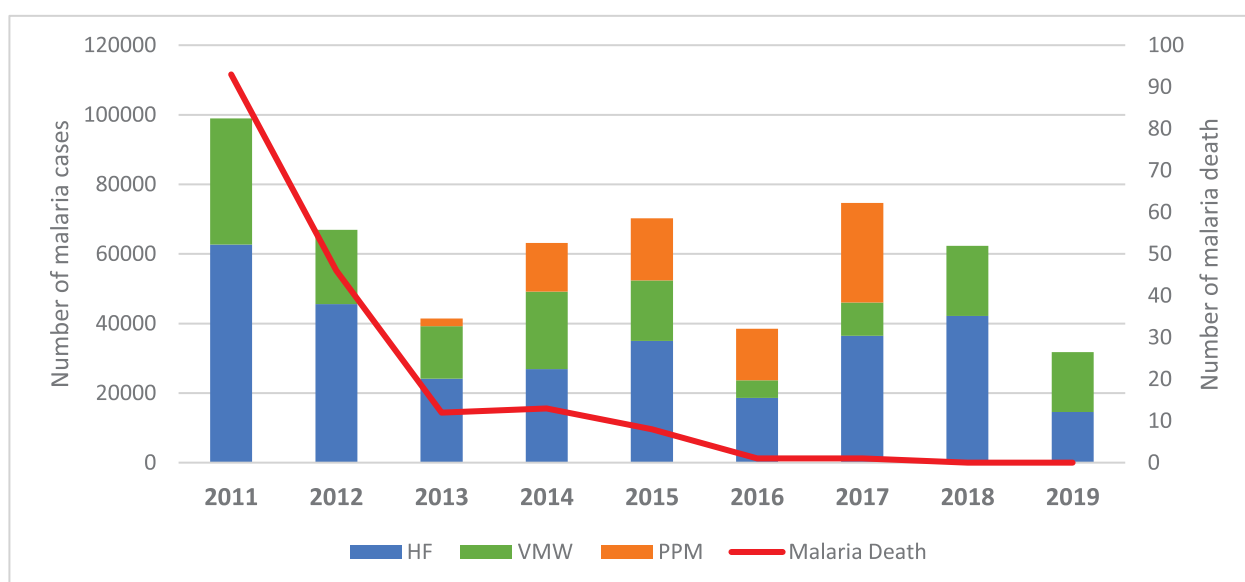
¹⁸ Sinka, M et al. Dominant Anopheles vectors in human malaria in Asia-Pacific. Parasite vectors. 2011.

the relative importance as a vector is diminishing as deforestation continues. *An. minimus* has been reported as a more opportunistic vector feeding on humans or animals depending on availability. It is more exophagic and exophilic than *An. dirus*, requires less shade and less vulnerable to the effects of deforestation. *An. maculatus* is an important secondary vector often present at the margins of hilly forest zones and more zoophilic and exophagic than *An. dirus* and *An. minimus*. With changing ecology, such as deforestation, the less efficient sun-loving *An. maculatus* and members of other species groups such as *An. hyrcanus* and *An. barbirostris* are increasingly being implicated as malaria vectors.

2.3 Disease Burden

Reported malaria cases have significantly declined in the recent past, from almost 100,000 cases in 2011 to 32,275 confirmed malaria cases in 2019 (Figure 5). The VMW network plays a significant role in diagnosing and treating patients. In 2019, 53% (17,194 / 32,275) of the total malaria cases are treated by VMW. While the public private mix program (PPM) has played a role in the past several years, it has been phased out in April 2018 and now all suspected cases should be referred to the public sector.

Figure 5: Reported malaria cases and deaths, 2011 – 2019 by HFs, VMWs and PPMs¹⁹



Testing levels decreased in 2016 when payment modality of VMWs required to change from cash to electronic payment arose with sustaining the VMW network (Figure 6). During that year, less than 40,000 cases were tested, which was significantly lower than previous years, likely representing an underdiagnosis due to low testing levels. Refocusing the program on the VMW network has allowed nationwide testing levels to increase over ten-fold to 607,005 tests performed in 2019. VMWs conducted 426,165 tests in 2019,

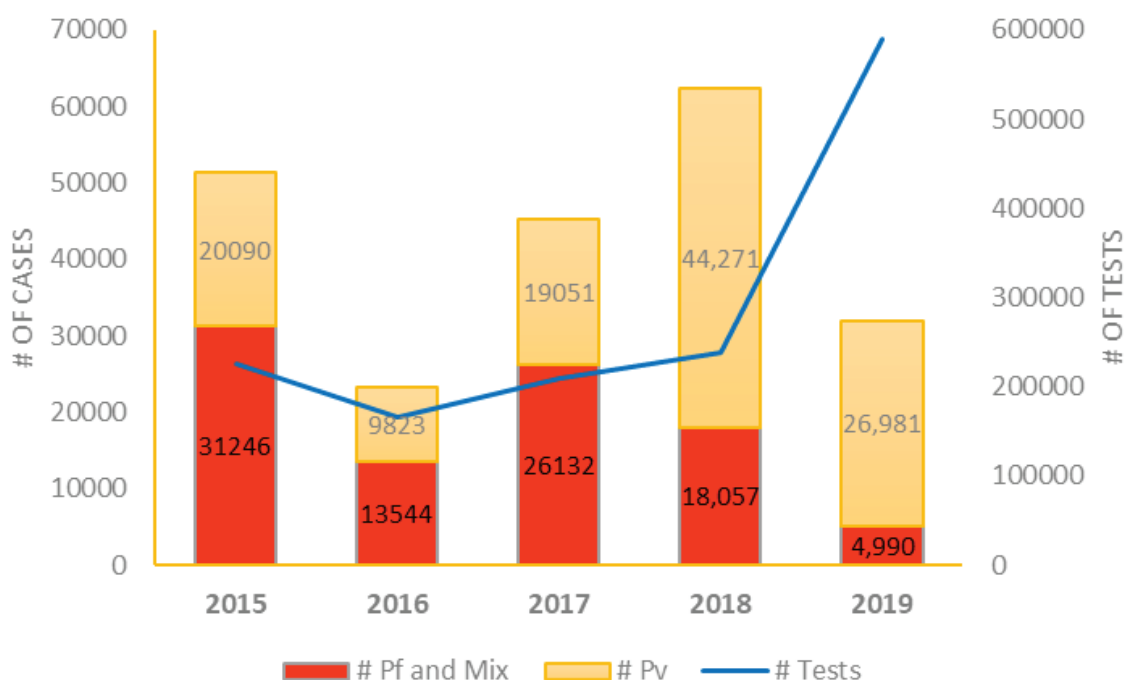
¹⁹ Malaria Information System whole country data



70% of the total tests in the country. Increased testing and ABER provide greater certainty that the true burden of disease is indeed decreasing in 2019 as compared to 2018.

In 2011, malaria was responsible for over 90 deaths in Cambodia, which has steadily and progressively declined. In 2018 and 2019, there were no recorded deaths from malaria, achieving the goal to halt malaria mortality by 2020 ahead of schedule.

Figure 6: *Plasmodium falciparum*/Mix and *Plasmodium vivax* cases in Cambodia from 2015 – 2019 in endemic areas with numbers of tests performed²⁰



The distribution of malaria rates is highly dependent on geographic region, with the forested areas in the northeast and southwest experiencing the highest annual parasite indices (API). For example, Mondulkiri province had highest incidence rate of malaria in the country in 2018 – 2019, with an API of 77 per 1000 population in 2018 which decreased to 49 in 2019²¹. In comparison, the national incidence of malaria in Cambodia in 2019 was 1.95 per 1,000 population. Increased testing rates contribute to more accurate estimation of the API throughout the country to be monitored, and continued efforts must be made to increase ABER in endemic areas to ensure all cases are detected (Figures 7 and 8).

²⁰ Malaria Information System data

²¹ Malaria Information System data

Figure 7: API by operational district, 2019²²

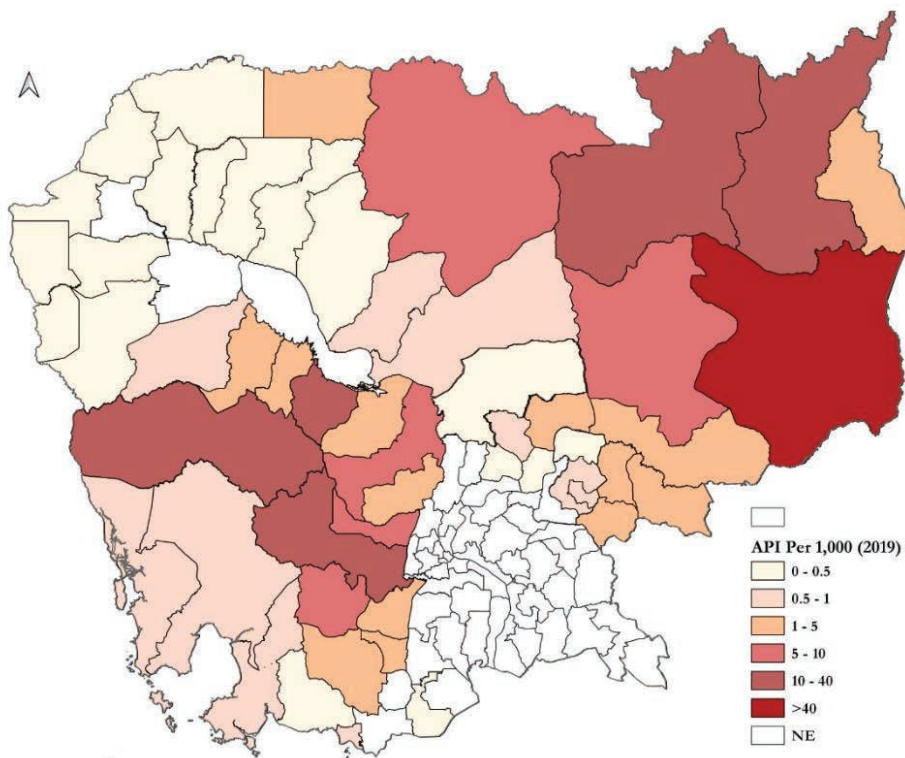
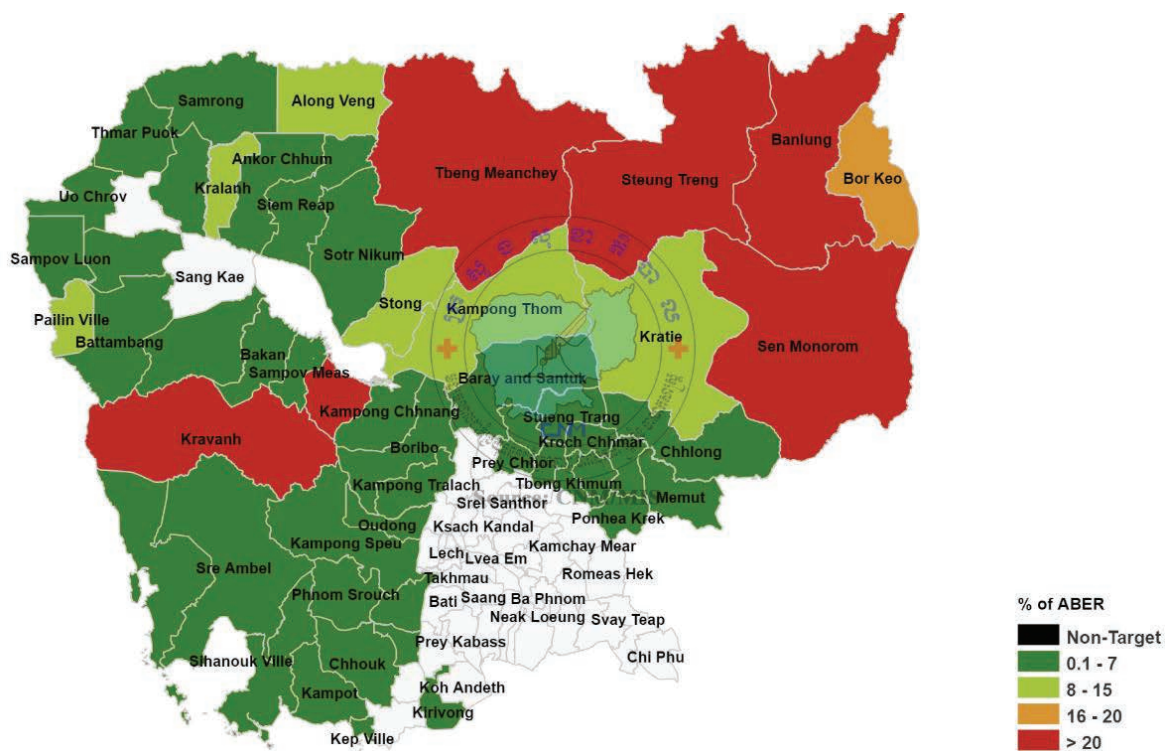


Figure 8: ABER by operational district, 2019²³

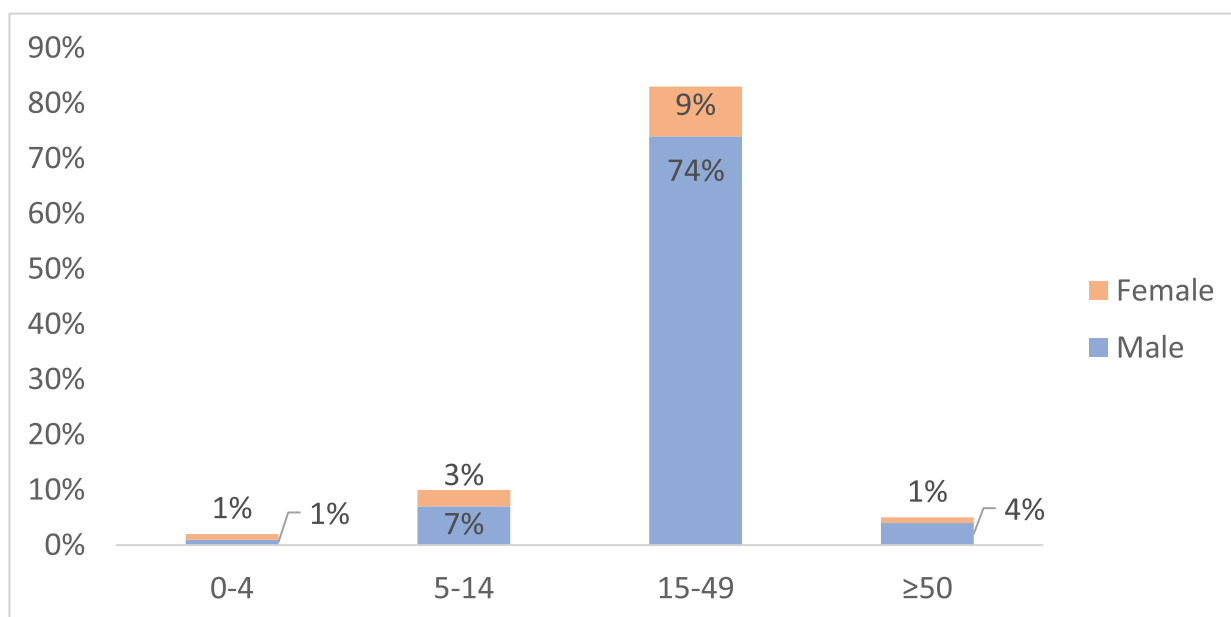


¹⁹ Malaria Information System whole country data



Malaria disproportionately affects working age men, particularly the 15 – 49-year-old age group. Continued focus on the mobile and migrant population can further target this at-risk group.

Figure 9: Percentage of malaria cases by sex and age group, 2019²⁴



2.4 Recent Situation and Trends

In recent years, Cambodia has made impressive progress to control the malaria burden of the country and continue towards its goal of elimination *P. falciparum* in 2020 and all forms by 2025. Strong commitment from the government, well-planned programmatic strategies with adequate funding, and collaboration with partners have all been key components to the successful program.

Numerous focused efforts have helped bring malaria levels to record lows in 2019, and ongoing challenges require sustained effort and adaptable strategies to continue towards elimination.

2.4.1 Case Management

Using rapid diagnostic tests is needed both for case detection as well as surveillance of malaria rates in the population. Endemic areas at OD, HC, and VMW levels regularly track malaria testing data, with a goal of decreasing the test positivity rate (TPR, # positive tests / # total tests) and increasing the annual blood examination rate (ABER, # tests in one year / # population). TPR in the first half of 2018 was 30% and decreased dramatically to 8% for the same period in 2019 with concomitant increased testing rates,

²⁴ Malaria Information System data

suggested an increased practice of testing broadly²⁵. Within the 53 endemic ODs, annual blood examination rates have been 3 – 6.5%, despite a target of 7% by 2018.

Transmission of malaria peaked in 2017 after the VMW program was suspended temporarily. There was about a 90% decline in testing by VMW between 2014 and 2016. In late 2017, the village and mobile malaria workers (VWM and MMW, respectively) were re-established as the primary, on-the ground workforce to educate, diagnose, and treat malaria. Electronic payments were successfully set up through Wing in 2017-2018. In 2019, the workforce consisted of over 4,000 VMW and MMW, who performed around 72% of national malaria testing in the first half of the year²⁶. VMWs and MMWs provide testing services with rapid diagnostic tests (RDTs), and for positive patients administer ACTs according to the National Treatment Guidelines.

Health centers, VMW and MMW also provide *P. falciparum* patients single low dose primaquine (SLDP) to block the transmission of *P. falciparum* malaria. In 2019, dosing guidelines for Primaquine were updated to introduce 7.5mg formulation to allow for treatment of patients between 20 – 50kg, and 15mg formulation for patients above 50kg. Recently, SLDP has been increasingly offered to cases involving *P. falciparum*; as of October 2019, 93% (263 / 284) of the *P. falciparum* and mix cases in the Intensification Plan provinces received this important intervention²⁷.

In 2013 CNM introduced the public – private mix program (PPM) whereby licensed private sector providers were given training and supplies to diagnose, treat, and report malaria infections. In April 2018, the MOH announced that PPMs were no longer permitted to test and treat malaria in Cambodia. PPM are now required to refer all suspected malaria patients to the public sector.

2.4.2 *Plasmodium vivax* radical cure

P. vivax and mix cases accounts for 85% of the malaria cases in Cambodia in 2019, and the patients cannot be fully cured with ASMQ resulting in the presence of dormant stage parasites – hypnozoites – in the liver, and ultimately the risk of multiple relapses. As of Q4 2019, four provinces have started piloting radical cure with G6PD testing and 14-day primaquine treatment targeting the hypnozoites of *P. vivax* to prevent relapse for non-deficient adult males. Provincial hospitals were assessed for adverse event management, and kickoff meetings and trainings were conducted for 88 health facilities. Adult male patients were tested to determine their G6PD status and if non-deficient were provided with a 14-day primaquine regimen. Challenges include patient adherence to the treatment regimen, short shelf life and cold chain requirements of G6PD tests and incorporating radical cure into existing established diagnosis and treatment protocols.

²⁵ 2019 Malaria Program Review

²⁶ Malaria Information System data

²⁷ Malaria Information System data



2.4.3 Supply Chain Management

Recent years have seen multiple supply issues of stock outs of different regimen of malaria drug supplies, especially the children dose, in operational districts and health centers. Although national guidelines refer to a pediatric dose of ASMQ, this is usually not available for VMWs or MMWs which has generated variations in practice including some referrals to health centers or splitting tablets in the field. A priority for the MEAF 2021 – 2025 will be to regularly monitor stock status data and take timely action to prevent and quickly address stock outs of all core commodities.

2.4.4 Surveillance

Case investigation

Routine case investigation began in 4 provinces by CNM in the last quarter of 2018, where 49 case investigations were done. Eight additional provinces targeted for malaria elimination in 2019 and all remaining endemic provinces were trained in surveillance for elimination by Q1 2020. In 2018, the Cambodia Malaria Elimination Project (CMEP) in Battambang province reported 99% of *P. falciparum* and mix cases were identified as local. In 2019, 194 *P. falciparum* and mix cases in the country were investigated, and 99% (193 / 194) are identified as local. Moving forward, systematic case investigations should be conducted in all elimination provinces.

Foci Investigation

Foci investigation is critical component of the surveillance algorithm, aiming to identify the drivers of transmission in the endemic areas and implementing targeted response to interrupt it. Foci investigations began in 2019 for 4 CNM provinces and 8 PSI provinces. Foci investigation involves 5 days of activities and coordination from the VMW level to the PHD²⁸. Included are interviews for household data, interviews about work and travel patterns for adult males, LLIN/LLIHN distribution, mosquito capture and analysis, and testing of children for malaria.

Malaria Information System

In 2018 the Malaria Information System (MIS) was fully operational in Cambodia to track malaria case testing and diagnosis. More recent improvements and incremental updates also capture surveillance for elimination data, real time reporting, and commodity stock management reporting, however not all modules are fully functional²⁹. Data is stored physically at CNM and on cloud servers. Currently there is a need for a server administrator to maintain the system, as well as a budget for maintenance and fuel for a generator. Reporting from health facilities and VMW has improved significantly, with reporting rates of 99% in 2019³⁰

²⁸ Foci Activities Testing Protocol, CNM 2019

²⁹ Malaria Program Review 2019

³⁰ Malaria Information System data



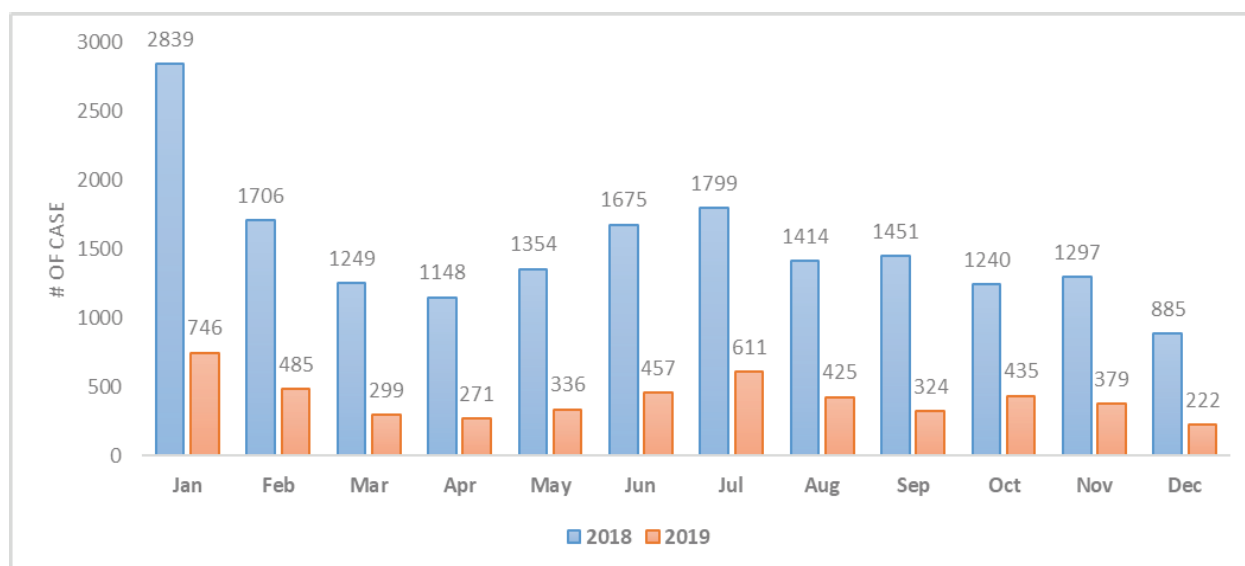
Intensification Plan

In October 2018, CNM initiated a 12-month Intensification Plan (IP) to reverse the trend of increased cases between 2017 and 2018. Malaria cases had rose substantially between January and March 2018, with an increase of 289% from the same period in 2019. Most of these cases (80%) were reported from 10 operational districts out of 102. Focus was on strengthening case management and increasing prevention and diagnosis among MMPs, including expanding the MMW cadre and increasing LLIN/LLIHN distribution in these high-risk areas.

The program has been extremely successful thus far, demonstrating an increase in testing and concomitantly a decrease in malaria cases³¹. In particular, testing increased 70% from January to September 2019 in IP provinces. A 73% reduction in cases involving *P. falciparum* has been demonstrated nationwide when comparing months of 2018 and 2019 (Figure 10). Figure 11 shows dramatic reductions in cases particularly in areas targeted by the Intensification Plan.

These efforts continue with the Intensification Plan 2 (IP2) has increased focus on *P. falciparum* elimination in high burden areas, and it expands the target area from 30 high burden health centers to 37 health centers. Geographically, Figure 12 shows throughout the country that hotspots of *P. falciparum* and mix cases have been declining over the Intensification Plan period.

Figure 10: Cases involving *P. falciparum* and mix nationwide, comparing 2018 and 2019 by month³²



³¹ Intensification Plan Review: Year 1, 2019

³² Malaria Information System



Figure 11: Cases involving *P. falciparum* and mix in Intensification Plan area of Cambodia, comparing 2018 and 2019 by month

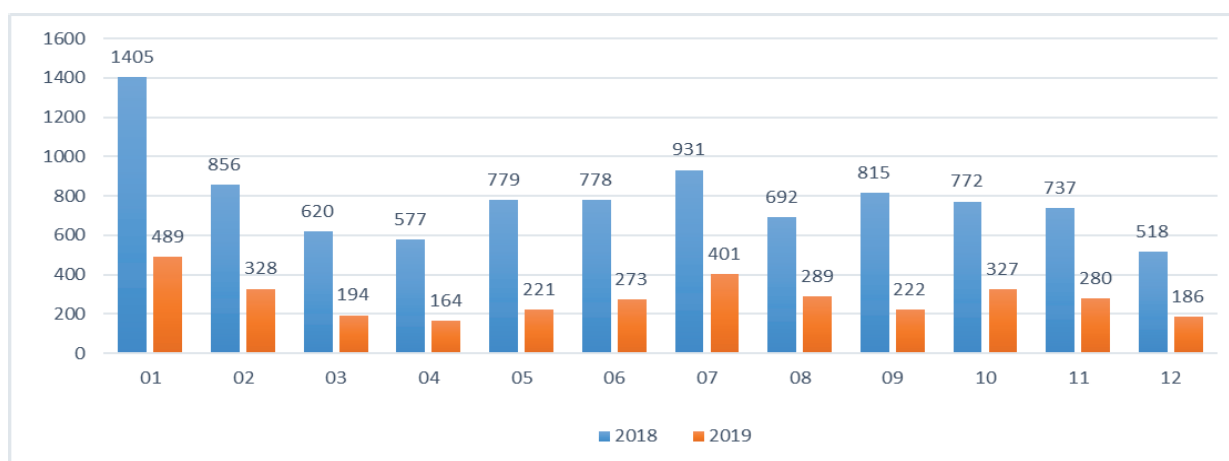
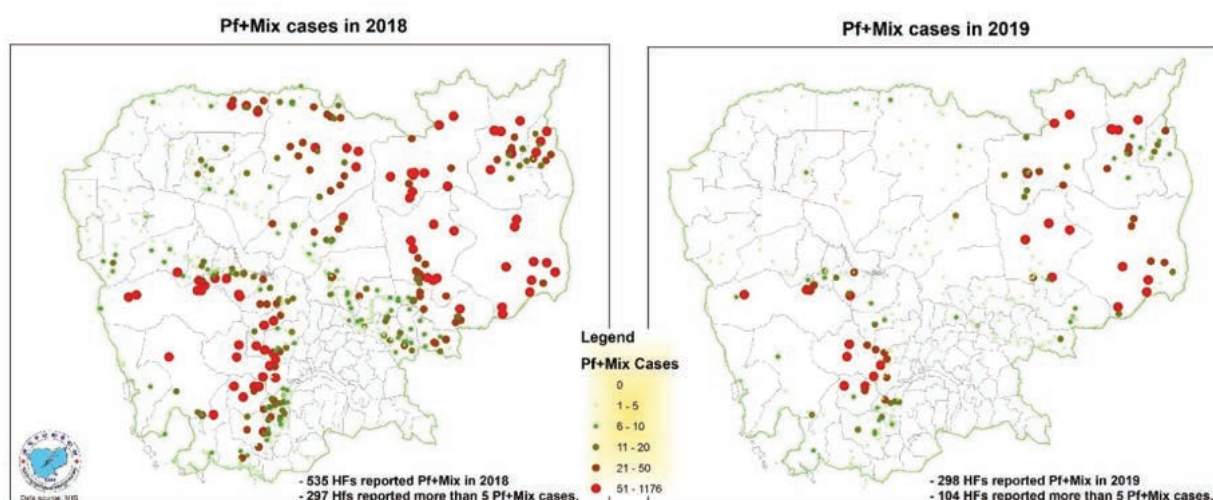


Figure 12: Reduction in *P. falciparum* and mix cases, comparing 2018 and 2019³³



2.4.5 Targeting Mobile and Migrant Populations

A large portion of new infections are occurring in the forest and far away from health centers³⁴. Many cases occur with mobile and migrant populations (MMP), some of whom participate on government prohibited activities, and therefore may be reluctant from the individuals to seek care. In a 2017 survey, 37% of MMPs had a fever in the prior 3 months, of which 89% sought medical care. Of those seeking care, only 29% received a parasitological test for malaria (most commonly in a health facility)³⁵. Of those who did receive a test, nearly 40% reported being positive for malaria. Substantial efforts have increased the

³³ Malaria Information System

³⁴ 2019 Malaria Program Review

³⁵ Mobile & Migrant Population in the context of Malaria Elimination, Operational Manual, 2018

availability of LLIN and LLIHN, particularly for forest goers as 10,422 number of forest packs were distributed between January – December 2019. Other protection such as repellent is planned for use, particularly helpful given that much work is done during peak biting hours, and this effort should be further scaled up.

2.4.6 Artemisinin-resistance

The emergence of artemisinin-resistant malaria in Cambodia in 2008 has highlighted the need to provide effective treatment while continuously monitoring for efficacy, particularly as the spread of artemisinin resistance globally could have disastrous consequences³⁶. The artemisinin-resistant *P. falciparum* strain seen in Western Cambodia around 2010 was later prevalent in North Eastern Thailand and Southern Laos, indicating a common origin and highlighting the importance of focusing on MMPs and eliminate promptly *P. falciparum* from the region to prevent further spreading of the resistant parasites³⁷.

While 2016 studies showed failure of dihydroartemisinin-piperaquine (DHA-PPQ) and artesunate-amodiaquine (AS-AQ), more recent therapeutic efficacy studies of ASMQ (artesunate + mefloquine), in 2017 and 2018 have demonstrated efficacy for both *P. falciparum* and 100% efficacy of *P. vivax*³⁸. In 2017, Cambodia reverted back to using ASMQ given with single low dose primaquine for *P. falciparum*.

Drug efficacy monitoring

Therapeutic efficacy studies (TES) are ongoing at five sentinel sites to monitor for drug resistance to ACTs. In 2018, TES at five sites for AS-MQ (Kratie, Mondulhiri, Pursat) and Pyronaridine-artesunate (AS-PYR, brand name Pyramax) for Ratanakiri and Kampong Speu, showed high efficacy (>95%), no day 3 positives, and 2 treatment failures, both with AS-PYR. However, AS-PYR still has a 98% efficacy at all sites. While there is no current need to switch regimen, since ASMQ is still efficacious, TES will continue to be implemented in Cambodia to monitor the treatment efficacy and inform potential changes in first line treatment.

Pyramax was tested at two sites in 2017, and two sites in 2018, and found to be effective³⁹. Hence, Pyramax can be considered for use as an alternative ACT, or second-line treatment, in Cambodia. Given the current efficacy of AS-MQ and Pyramax, and that the TACT combinations considered include artemisinin partner drugs that have had high failure rates in Cambodia (e.g. amodiaquine and DHA-piperaquine), this is not being currently considered as potential treatment regimens in Cambodia.

³⁶ Noedl H et al. Evidence of artemisinin-resistant malaria in western Cambodia. NEJM. 2008

³⁷ Mobile & Migrant Population in the context of Malaria Elimination, Operational Manual, 2018

³⁸ “Cambodia Country Presentation: TES and iDES”, 7th Meeting of the GMS TES Network, 28-29 October 2019

³⁹ “Cambodia Country Presentation: TES and iDES”, 7th Meeting of the GMS TES Network, 28-29 October 2019



As a response to the threat of artemisinin resistance in the GMS, some researchers are conducting research on triple artemisinin combination therapies, specifically artemether-lumefantrine + amodiaquine and DHAPPQ + mefloquine⁴⁰.

2.4.7 Program Management

Leadership

Cambodia has demonstrated strong political commitment to malaria elimination. The Cambodian government committed financial resources in the MEAF 2016 – 2020 to support infrastructure, transport, and permanent human resources, and will continue to do so under the MEAF 2021 – 2025.

Health activities have been decentralized to the peripheral level for more efficient and effective implementation of strategies. The MOH announced in 2019 that additional responsibility and authority would be given to the commune level to implement health services to the community. In MEAF 2021 – 2025 CNM will prioritize integration with this level of the health system.

While the subnational level will be committing to their malaria elimination mandates, there is a significant challenge to quality implementation and provision of services given the low resources and capacity within the staff across the health levels. Resources and capacity growth severely affect hiring and retaining of talented staff within the public health system in Cambodia. In order to strengthen subnational capacity, policies need to be adapted and updated and clearly communicated at all levels. While the central level has adequate capacity and technical assistance to draft policy, there is an opportunity to speed up the approval and endorsement of policies so that they can be rolled out in a timely manner.

Coordination

CNM has experience in managing concurrent multi-million grants for malaria. CNM has administered and received grants from GFATM since 2002; Bill & Melinda Gates Foundation since 2009, and Pilot Elimination Project in Preah Vihear province under Asia development Bank (ADB). For GFATM, CNM has acted both as Principle Recipient and Principal Implementing Partner (PIP).

CNM primarily manages the national malaria program with assistant from 8 partner organizations, mostly CSOs. Partners offer a range of malaria expertise in terms of research, technical assistance and implementation of malaria program throughout the country, but coordination remains a challenge. CSOs maintain varying types of expertise that needs to be better aligned with the new package of interventions for the MEAF 2021 – 2025.

⁴⁰ Veiga et al. Nature Commun 2016



3/STRATEGIC

Overview



3. Strategic Overview

VISION: A Malaria-Free Cambodia

MISSION:

Provide leadership for implementation of core malaria interventions to reach all the at-risk population, and ultimately achieve no indigenous malaria cases detected in Cambodia.

GUIDING PRINCIPLES:

1. Human rights and gender equality
2. Equal access to high quality health services that are patient-centered services and safe
3. Building capacity and ownership to strengthen subnational levels
4. Decentralized approach: bottom-up decision making from the subnational level
5. Transitioning to integrated public health services
6. Cost-effective approach
7. Roles and responsibilities of partners and donors is will defined
8. Performance-based approaches and accountability
9. Scale up evidence-based interventions
10. Cross-OD communication and coordination

Eliminate malaria by 2025

Objective 1:

Early detect and effectively and safely treat 100% of cases, and provide effective personal protection to at least 90% of the high risk population

Objective 2:

Intensify focal interventions to interrupt transmission in endemic locations with highest risk (including mobile migrant population / forest goers) to reach API less than 0.1 for *Plasmodium falciparum* by 2020 and all species by 2025

Objective 3:

Investigate, clear, document and follow up 100% of cases and foci to interrupt transmission and prevent re-establishment





1 **Early detect and effectively and safely treat 100% of cases, and provide 1 effective personal protection to at least 90% of the high-risk population**

In order to accelerate progress towards elimination, there will be maintained focus on ensuring access to malaria prevention, diagnosis and treatment. In the MEAF 2021 – 2025, the program will expand implementation in alignment with WHO-recommended strategies so as to increase the effectiveness of responses and end preventable malaria morbidity and mortality.

1.1 Ensure all suspected malaria patients receive a parasitological test within 48 hours of symptom onset and all patients with confirmed malaria receive first-line anti-malarial treatment and other treatment regimens according to National Treatment Guidelines

Timely diagnosis is needed to prevent transmission, and all suspect malaria patients should receive a parasitological test immediately, within a maximum 48 hours from symptom onset, in order to quickly link cases to treatment. Diagnostic and treatment guidelines will be updated regularly and appropriately disseminated for uptake to reflect the newest technology and more appropriate pharmaceuticals and adapt to the ongoing elimination campaign. Further, health facility staff and VMWs will undergo biennial case management training and ongoing supervision for diagnosing and treating malaria cases, including algorithms for complicated patients and *P. vivax* radical cure.



Diagnosis will take place with RDTs at health facility and VMW level, and microscopy at hospital level. For patients who receive a positive RDT for *P. vivax*, a G6PD test will also be administered to both male and female patients in order to determine eligibility for safe radical cure.

The microscopy network of both physical devices and technical capacity must be strengthened and maintained for utilization at provincial and referral hospitals. A more centralized system for microscopy can ensure higher quality and accurate results for the more complicated cases in need.

After diagnosis, all patients must receive appropriate treatment. Patients testing positive for *P. falciparum* will receive ACT and single low dose primaquine according to the National Treatment Guidelines. Patients testing positive for *P. vivax* or mix infections will be eligible for safe radical cure with primaquine. Newer regimens, like tafenoquine, will be explored in the Cambodia context, beginning with research and pilot programs. To ensure completion of treatment, protocols for follow-up on adherence will be developed based on evidence and feasibility. In addition, building systems for pharmacovigilance is important to monitor for adverse outcomes.

1.2 Ensure all patients with confirmed severe malaria are treated according to National Treatment Guidelines

While most cases of malaria are uncomplicated and can be successfully managed at the VMW or health center level, there are still cases of severe malaria which require prompt recognition and referral to the hospital level for management. Health care workers will be trained to recognize and appropriately refer these cases, and hospitals must have staff who are available and competent in the management. While there has not been any mortality to malaria since 2018, any case fatality needs to be investigated.

1.3 Ensure all targeted villages are achieving full coverage of diagnosis and treatment for all confirmed cases within 48 hours of symptom onset by community networks (VMW/MMW)

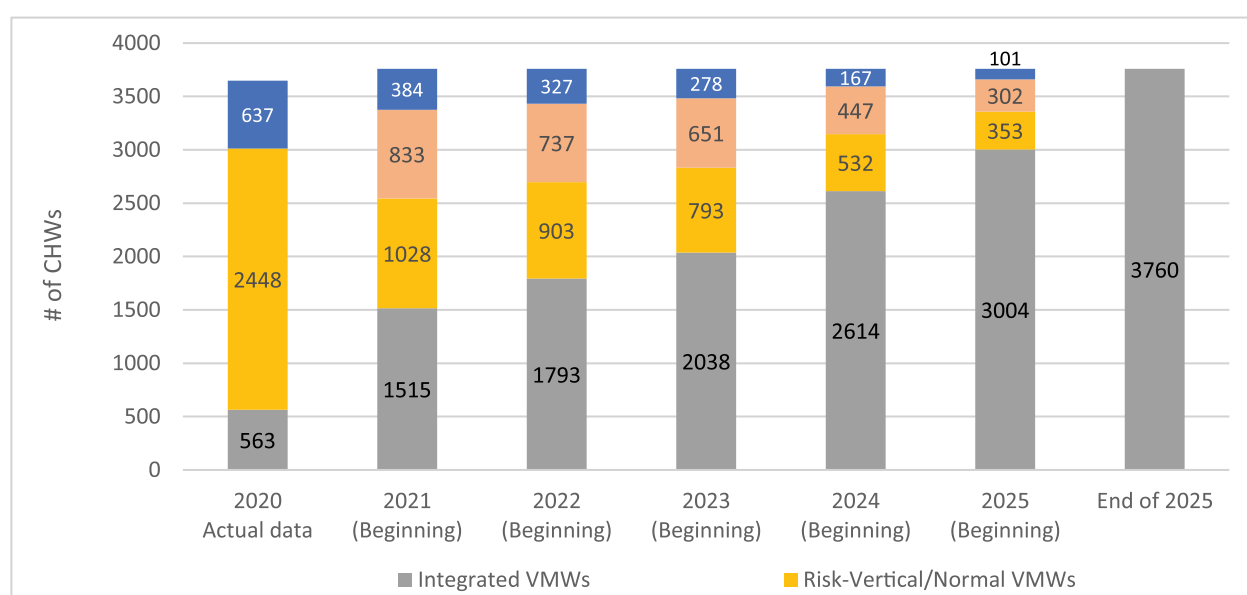
The Village Malaria Worker program, consisting of VMW and MMW, has proved a crucial element to target persons at the community level and within hard to reach areas. The network will not only be maintained but in the coming years also focused on strategic villages as the country moves towards elimination. High-risk villages will be identified and targeted, so that sufficient human resources can be allocated there.

The scope of VMW work includes both malaria prevention and case management, with cases being identified through both active and passive case detection. This workforce must stay adequately trained and engaged, through initial trainings, updates, and regular meetings. Given the need to coordinate and accurately capture data in areas of high transmission, VMWs will meet monthly in high-risk areas. Monitoring and supervision are needed to sustain activities, and quality assurance assessments are planned quarterly.



In villages that have a reduced burden, VMWs will meet less frequently and will integrate with other health committees such as the Village Health Support Group (VHSG) platform to address other diseases such as HIV, TB, or bacterial infections in the community. Key activities in the MEAF 2021 – 2025 will be stakeholder consultations to develop the integration strategy. It is envisioned that over the next five years the number of MMW and regular (vertical for malaria) VMW will be reduced according to the malaria burden (Figure 13), while VMWs who are integrated with other diseases will increase to be fully at-scale by the end of 2025.

Figure 13: Projected number of villages per type of community health worker (CHWs), 2021-2025



1.4 Ensure all suspected malaria patients from private sector providers are referred to a public sector facility

Patients presenting with symptoms suspect of malaria should be immediately referred to a public sector facility via a referral slip which will be tracked for program evaluation. If private sector sites are found to lack referral practices or are found to be in possession of malaria testing or treatment supplies, they need to be investigated with regular visits from the CNM and local DDF offices to identify challenges and strengthen the referral system. The CNM maintains a standard operating procedure to provide guidance and clear expectations to private sector sites.

1.5 Ensure all national, provincial and referral hospitals, and testing labs are qualified for malaria services and comply with quality assurance guidelines

Quality assurance testing for laboratories ensures proper diagnosis and management of malaria cases, and the WHO has outlined activities to set and maintain standards. Malaria Diagnosis Quality Control and Assurance Guidelines and related standard operating procedures are key documents to outline this process. In addition, a quality-assured national malaria slide bank is recommended. At the various levels of laboratory offering microscopy (national, provincial, and referral hospitals), services will need to be maintained and accredited, including regular slide collection and evaluation of staff for proficiency. In addition, considerations such as antimalarial drugs, other commodities, and storage environments will have routine quality control testing. During this program period, increased emphasis will be placed on external quality control mechanisms.

1.6 Test and regularly monitor drug efficacy

Through therapeutic efficacy studies (TES) and integrated drug efficacy surveillance (iDES), drug regimens are monitored for efficacy and resistance patterns can be identified early to avoid widespread treatment failure. Programs for regular monitoring will continue at the TES sentinel sites. The results for efficacy testing will be shared and disseminated in a timely manner, allowing CNM to use real-time data to coordinate responses. Drugs with demonstrated resistance or expiration must be removed from circulation.

1.7 Improve the uptake of malaria interventions for case management and prevention through IEC/BCC

The general population can be reached through information education communication (IEC) and behavioral communication change (BCC) to promote malaria prevention in the community. A working group dedicated to this will update the national strategy and ensure the design, development, and distribution of appropriate materials. Materials should cater to different risk groups with targeted, relevant messages. They will be distributed through large campaigns such as mass media on television and radio as well as at the individual level from VMW and health facilities, including PPM. The health facility staff must also be trained to properly counsel and distribute materials to their patients.

Importantly, there will also be a system for monitoring and supervision to evaluation the effectiveness of IEC/BCC activities. Supervision will be conducted to select health facilities as well as VMWs to identify barriers, challenges, and identify solutions moving forward. Regular data review can evaluate for effectiveness of communication and its effect on public perception through testing rates.



1.8 Achieve full coverage of at-risk population with appropriate personal protection and vector control tools

Vector control plays a key part in elimination strategy. Insecticide treated nets (ITN) were introduced over a decade ago into Cambodia and provide personal protection as well to control to mosquito population. Updated vector management strategies will routinely be revisited and disseminated to adapt to potentially changing vector distributions and new vector interventions. Coverage exercises, including identifying GPS locations of health centers and VMW work, can help identify how to best close gaps. LLINs/LLIHNs will be distributed to all at-risk populations through mass distribution campaign in 2021 and 2024, with the aim of cover all the villages under the highest risk strata (3-5). The program will aim to achieve a coverage of 1.8 people per LLIN and will provide one hammock net to each household. In addition, rapid assessment of the coverage of post LLIN distribution must be conducted in order to ensure that the program target have been achieved. In the instance where the at-risk villages are reporting low LLIN ownership, a continuous distribution of LLINs/LLIHNs will take place.

1.9 Strengthen entomological surveillance of vector-borne diseases with integrated vector management

A successful entomological surveillance component includes a functional laboratory, regular monitoring, and mapping and analysis. Capacity will be built within the entomology department for these routine activities by appropriate staff recruitment and targeted training. Vector samples are to be collected from sentinel sites. Importantly, receptivity and vector density will be monitored in both active and non-active foci. For example, while areas with active foci will be monitored during foci investigation, routine monitoring should still be done in selected sites with no local cases in the past few years. Centrally, the program will create and maintain an insectary and ensure the entomologic unit is equipped to properly analyze sample data, including microscopy and ELISA. Lastly, geographic mapping systems will be utilized to map the distribution, transmission foci and vector control interventions.

1.10 Monitor insecticide resistance routinely

As insecticide serves as an important method in vector control and personal protection, there is a strategy to monitor insecticide resistance. This will necessitate procuring the appropriate supplies, collecting mosquitos from sentinel sites for testing, and reporting results. In addition, site visits are to be performed to assess the efficacy of vector control tools in practice at several sites.





2

Intensify focal interventions to interrupt transmission in endemic locations with highest risk (including mobile migrant population / forest goers) to reach API less than 0.1 for *P.falciparum* by 2020 and all species by 2025

In the face of elimination, countries must intensify efforts to reduce onward transmission of new infections in defined geographical areas. This objective focuses on hotspots – areas in strata 5 based on the stratification – to target high risk populations and halt the local transmission. The development and adoption of innovative solutions will be essential to accelerate towards elimination of malaria in these hotspots. Increasing the relevant workforce capacity and maintaining quality services will be key in supporting these efforts. With the intensified efforts, whole country targets to reach API less than 0.1 for *P.falciparum* by 2020, with zero *P.falciparum* case by 2023, and all species reach API less than 0.1 by 2025.

2.1 Utilize risk stratification and mapping to identify and monitor hotspots and deploy intensified network of MMW

Understanding patterns of migration of the MMPs helps identify potential geographic areas for malaria introduction and transmission. Regular mapping analysis will be performed both at central and subnational levels, using both geolocation modules within MIS, location identification by the VMW, and community engagement. Operational research will be used to better understand the MMPs and forest-goers and identify best-practices.



2.2 Conduct training for MMW in high burden hotspot areas

Mobile malaria workers (MMW) are the workforce principally responsible for providing access to life saving case management and prevention services to the hard-to-reach population, and they must be strategically placed to maximize their coverage of high-risk areas. MMWs may need additional training for their outreach activities beyond the VMW work, and they as well are expected to participate and contribute to monthly meetings of the VMW network.

2.3 Ensure all confirmed cases among MMP and other underserved populations are diagnosed and treated within 48 hours of symptom onset

Timely administration of treatment to newly infected persons is key to reducing transmission of malaria. Both passive and active case detection is planned for the areas identified as highest yield for contacting the at-risk population: high-transmission posts, hotspots and forest entry points. Beyond the traditional mobile and migrant workers, other informal groups including forest-goers for other purposes and co-travelers of MMWs are targeted for malaria testing and treatment services.

2.4 Foster interventions to impact infection reservoir in high risk locations and communities

While passive case detection relies on the individual's initiative to seek care, active case detection provides a unique opportunity to find affected individuals who may not engage with the formal public health system otherwise. MMWs will conduct active case detection (outreach) twice per month and distribute forest pack to MMP41 . Guidelines will be developed to specifically target infection reservoirs and the corresponding interventions to deploy as evidence shows. If strong evidence base is established, the program may consider providing pre-exposure chemoprophylaxis to forest goers in active foci and screen all people coming back from the forest by VMW/MMW.

2.5 Ensure monitoring, mentoring and supervision for MMW activities in high burden hotspot areas

This strategy recognizes an adequate and high-quality workforce is crucially important in the hotspot areas of active transmission, involving VMWs, MMWs, and related health centers. Training will be optimized, conducted, and reinforced with the health care workers involved to align with the most recent strategies.

⁴⁰ Veiga et al. Nature Commun 2016



Concurrently, the supportive supervision will be strengthened and expanded to include more monitoring and mentoring activities.

Routine collection of data will track the progress of the MMW work. This includes all activities for analysis of their routine activities to actively and passively identify as-risk persons and includes the MMP questionnaires pre and post forest pack giving. Development of a GPS tool for geolocation of cases from mobile phones is a novel data piece that can be incorporated into MMW work. Data will be regularly reviewed for timely feedback generation, and this should be tracked from both local and central staff as well as partners.

2.6 Foster collaborative effort between health centers and authorities to better track and target MMPs to provide preventative and curative services

A partnership between the health department and local authorities could help with targeting MMPs for diagnosis and treatment. A high-level commitment from authorities in hotspot villages is crucial and can facilitate the dissemination of IEC/BCC materials. Engagement with Provincial and District Malaria Elimination Committees and national government ministries, including Ministry of Forestry and Ministry of Environment, will be beneficial and will ensure multi-sectoral collaboration for malaria elimination. Partners with at-risk populations can be enrolled into routine screening, for example the Royal Cambodia Armed Forces (RCAF) who deploy into forest areas. Aligning with the RCAF and other organized forestgoers can assist in both prevention and early detection for the groups. Other partnerships should be explored, maintained, and expanded to reach the goal of malaria elimination.

2.7 Create awareness and adapt behaviors by MMP and forest goers, and improve community mobilization through IEC/BCC strategies

IEC/BCC is a core component to affecting lasting change in a population, and the most effective materials are targeted to the needs of each group. Appropriate materials will be designed with key messages, particularly for MMP and forest goers. Routine distribution can occur through regular touchpoints, and other creative methods like signs and speakers with messaging should be explored. Training and advocacy are not only important to the health sector workforce, but others like military, police, and forest rangers. Engagement with the community can occur through community mobilization sessions in the highest risk areas. Information on effectiveness of IEC/BCC will be monitored during monthly meetings and community mobilization sessions.

2.8 Provide personal protection and appropriate vector control tools to MMPs and forest goers

Equipping MMPs with personal protection and vector control tools protects, educates, and empowers the group. Forest packs are the principal methods to distribute personal protection and vector control tools (like repellent and LLIN/LLIHN), and MMPs can be localized with the enhanced MMW workforce and newer tools like GPS for migrant mapping. Current strategies like repellent will be investigated for effectiveness and new and innovative strategies should be explored, such as insecticide treated clothes or tents.





3 Investigate, clear, document and follow up 100% of cases and foci to interrupt transmission and prevent re-establishment

Strengthening malaria surveillance is fundamental to program planning and implementation and is a crucial factor for accelerating progress. The malaria program will continue to strengthen its health management and information system to ensure that resources are targeted towards the most affected populations, that gaps in program coverage are identified, that outbreaks are detected, and to assess the impact of interventions. Surveillance will also trigger a locally tailored response to every detected infection, with all reported cases and foci being investigated and managed to halt further transmission.

3.1 Strengthen capacity for managing, monitoring and supervising all surveillance activities

Surveillance activities are to be performed regularly; the presented data will identify program needs and guide response. Surveillance involves all levels of the malaria workforce, and special attention should be paid to annually train and refresh workers at the VMW/MMW, health center, OD, and PHD levels. Integrated surveillance supervision visits are another way for CNM and the PHD/OD level to connect with the health centers to verify activities and gather information.



3.2 Regularly upgrade system specifications, functions, and the modeling features of Malaria Information System (MIS) to improve visualization, interpretation, and usage of data at all levels

The MIS serves as a powerful tool to aggregate and analyze data during the malaria elimination process. Hardware must be maintained, and upgrades to software will occur on all levels as new specifications are released. New applications for geolocation data can be used to map household data, highlight vector locations, and vector control strategies, and other systems can perform modeling and trigger automatic, real-time alerts. The data will be regularly used to update risk stratification, in particular this can guide appropriate distribution of the VMW workforce and LLINs distributions. Integrating supply chain management (stock levels, quantification, and procurement) and electronic supervision checklists can also help with subnational program management. Developing a patient ID feature would include more granular detail for patient care and management data, such as only needing to test a particular individual once for G6PD deficiency because their status would be linked to their ID. Referrals from private sector can also be integrated into the MIS for monitoring.

3.3 Improve processes, tools, and trainings to ensure all levels submit complete and accurate reports on time

Timely reporting is necessary to guarantee immediate action for identifying at-risk areas and transmission interruption. All health centers will be equipped with the proper reporting tools to be maintained, and smartphones and tablets can be used for GPS coordinate collection. Regular training and supervision to all levels (VMW, HC, OD, PHD, central) staff can help ensure timely, accurate, and complete reporting.

3.4 Ensure all confirmed cases for all species are notified, investigated, and classified within 24 hours, and responded within 3 days

While symptomatic individuals should be identified and treated within 48 hours, any confirmed case should then be immediately notified, an investigation triggered, and the infections classified by their most likely place of origin within 24 hours. Performance-based payment schemes may further incentivize health care workers to complete the process and conduct a case response. Correct epidemiological classification of malaria cases is the basis for selecting appropriate measures and classifying foci.

3.5 Investigate and classify all new active foci within 7 days

A timely response depends on potential foci being identified rapidly, and all new active foci should be investigated and classified within one weeks when local cases are detected. A joint effort involving the PHD, OD, and HC will lead the effort, and ideally can input information into an updated MIS feature specifically for foci investigation. CNM entomology unit will conduct an entomological investigation as part of the foci investigation in order to best identified the vector behavior and the response required. The foci register should be updated on an annual basis.



3.6 Implement interventions to stop transmission in active foci

In this upcoming period, foci responses will be swift and coordinated. Reviewing the data from the investigations (including entomological monitoring and susceptibility monitoring) will help guide the correct response. Indoor residual spraying (IRS) will be deployed in all classified active foci to halt transmission, if entomological surveillance findings recommend IRS. Alternatively, mop up campaign with LLIN distribution will take place. The VMW/MMWs should be recruited to actively test and treat high risk populations in the target areas. Regular supervision and foci review meetings provide the opportunity for data alignment in the program.

3.7 Detect and respond to all outbreaks within 7 days

Health centers and OD malaria supervisors will be provided adapted tools and training to closely monitor abnormal increases in incidence to detect localized outbreaks that could happen due to environment changes or population movements. PHD and OD malaria supervisors will be trained to conduct and report rapid outbreak investigation. Specific sessions will be included into the trainings on the management and interpretation of Surveillance data.





4

Enabling Environment: Strengthening program leadership to maintain effective program management and coordination at central and provincial levels and harness innovation and research

Eliminating malaria requires a well-trained workforce, engagement in multiple sectors, strong community involvement and commitment at the highest levels of leadership. The success of the implementation of the MEAF2 strategy relies on a system capable of performing the required programmatic activities and an environment allowing coordinated implementation.

4.1 Strengthen program leadership and coordination within country, regionally, and globally

Malaria elimination will be coordinated on all levels, particularly when reviewing data, determining future steps, and planning for implementation. The Multi-Sectoral Malaria Elimination Committee should exist at both the national and provincial level and regularly meet. Donors, partners, and implementers must also coordinate through monthly review meetings. In addition, cross-border meetings with neighboring countries are essential to coordinate efforts along the border regions. Malaria posts should be set up at strategic cross-border areas to provide testing and treatment services to MMP who travel between countries.



Lastly, data and strategies from Cambodia should be shared in regional and global forums to synchronize with larger goals and best practices.

4.2 Strengthen planning, program management, and execution at CNM and subnational levels

Well-functioning departments and management are crucial for the successful execution of a large malaria elimination program which must also focus on multiple smaller regions. Attention to human resources (HR) includes a dedicated HR manager for optimizing hiring, clarify roles, and set metrics for tracking staff performance. In particular, performance-based reward strategies should be explored how to stimulate more effective behavior. Beyond initial training, all staff should undergo regular refresher training.

Detailed annual work-plans and budgets at national and subnational levels will assist in the alignment of the program and ensure maximum resource absorption. CNM appoints management and focal points to monitor specified geographical locations and technical strategies such as surveillance. A Technical Working Group will meet bi-annually to provide oversight of activity implementation for all Enabling Environment Strategies.

4.3 Strengthen financial management capacity at CNM and subnational levels

As the malaria elimination programs is largely funded by large donors and an increasing domestic budget allocation, specific attention must be paid to management guidelines and the financial reporting structure. The operations coordination group comprised of CNM and funder agency meets monthly to review the budget absorption.

4.4 Strengthen Procurement and Supply Management Systems (PSM)

Procurement supply management is required for multiple commodities for testing and treatment of malaria. Procuring updating software, acquiring additional technical assistance, strengthening the national system can improve the process. The MIS will be improved to maintain forecasting and stock status information. Actively engaging CMS, including with a PSM Sub Working Group, will improve bidirectional communication with CNM. In addition to strengthening PSM for malaria commodities at the national and subnational level, attention should also be paid to fixed asset, records and management.

4.5 Advocate for high level political commitment to malaria elimination

High-level advocacy can ensure that policies and government contribution are also aligned with the CNM program goals. As the country nears towards elimination, there will be increased focus on following up individual cases; as such malaria needs to be established as a notifiable disease.



Annual strategy review meetings and disseminated progress reports will further engage other related ministries e.g. Education, Interior, Military, to review and refine strategy and increase cooperation. World Malaria Day and other similar events are important to raise awareness and highlight progress in Cambodia.

4.6 Research and development to respond to existing and new challenges

Investigational and operational research improve and expand programmatic activities. Coordinated efforts should determine top research priorities to explore in the five-year period. Strengthening the relationship with CNM and research partners will ensure appropriate research is undertaken, and all ongoing projects will be registered with CNM to provide a centralized database of activities.

4.7 Transition from a vertically funded programmatic approach to a sustainable whole-of-health system approach

In preparation for the future without endemic malaria and with less external donor funding, the Cambodian health system will focus on certifying elimination and transitioning to a sustainable, integrated health system. The WHO has delineated a rigorous certification process for malaria elimination which require dedicated steps to complete and process.

During the next five years, the VMW system will be integrated with other community health-worker outreach programs, such village health support groups (VHSG). This could start with the VMW in low-risk villages who can continue passive case detection while engaging in other disease strategies. Aside from the current funding for malaria and related programmatic activities, other external and innovative financing should be explored.





4/IMPLEMENTATION

of Strategic Plan



4. Implementation of Strategic Plan

4.1 Stratification

The 6,422 villages in endemic ODs were stratified into six categories (no risk, low, medium, risk, high, highest) using two covariates: village-level API for 2018 and 2019 and the percentage of forest cover within a three-kilometer radius of the center of each village.

API data was averaged across the two years to ensure that the high caseload in 2018 and the reduction of caseload in 2019 did not disproportionately affect the stratification results. For villages where GPS coordinates were not available (approximately 10%), the forest cover percentage of the commune was used as a proxy for the village.

Classification for API averages ranged from zero in the lowest category to greater than 20 in the highest while forest cover percentage went from zero to greater than 70%. Details of how specific API averages and forest cover percentages were translated into sub-scores can be found in Table 2.

Scores were calculated separately for the two covariates and combined to produce an overall stratification score which determined the stratification classification assigned to each village using the following formula:

Table 2: Categorization for Stratification (MIS)

$$\text{overall score} = \begin{cases} 0 & \text{when API score} = 0 \\ 5 & \text{when API score} = 5 \\ [API \text{ score} + (\text{forest score} * 0.25)] & \text{otherwise} \end{cases}$$

Assigned score	0 - No Risk	1 - Low	2 - Medium	3 - Risk	4 - High	5 - Highest
API (average of 2018-2019 total cases)	0	0.1 – 1	1.1 – 5	5.1 – 10	10.1 - 20	>20
Forest Cover *Weight 0.25 (if API > 0)	0	1 – 25%	26 – 50%	51 – 70%	>70%	>70%

In **Strata 5 – Highest risk**, intensified activities will be carried out through the placement of MMWs. MMWs participate in a meeting at health centers monthly, conduct passive case detection, conduct active case detection twice per month, distribute forest packs to MMPs, and hold community mobilization sessions regularly. All training, supervision, and surveillance activities, such as case investigation and response, foci investigation and response, and TES/iDES studies, will be crucial interventions in this stratum to monitor and reduce the high case burden.



In **Strata 4 – High risk**, LLI(H)N will be distributed to the villages during both mass campaign and continuous distribution, and VMWs will be located in the villages which are >5 KM away from the health centers to ensure the access of malaria testing and treatment. Regular activities, including training, supervision, passive case detection, active case detection once a month by VMWs, and basic surveillance activities, will be implemented.

In **Strata 3 – Risk**, VMWs will be located in the villages which are >5 KM away from the health centers to ensure the access of malaria testing and treatment by conducting passive case detection. LLI(H)N will be distributed to the villages during both mass campaign and continuous distribution, and regular activities, including training, supervision, and basic surveillance activities, will be implemented.

In **Strata 1 – Low risk and 2 - Medium risk**, which have less case burden and decreased malaria-related activities, VMWs will be integrated with other community health platform to address other diseases such as HIV, TB, or bacterial infections in the community and drive toward malaria elimination.

In **0 – No risk strata**, there will be no VMWs/MMWs in the villages since the API is zero, but a case management training will be conducted every three years and stock-base of health commodities will be provided in the hospitals for use with imported cases.

4.2 Phasing

In MEAF 2016 – 2020, the country had 3 phases: elimination (strata 0-1), transitional (strata 2-4), and high burden (strata 5). CNM led the work package for National Coordination, including national strategies and plans, MIS development, supervision (QA) methodologies, and coordination mechanisms. CNM also led the scale up of surveillance for elimination activities. CSOs provided technical support in geographical packages, including case management, vector control, IEC/BCC, and passive surveillance.

In the MEAF 2021 – 2025 the whole country will be in elimination phase given the reduction in cases, referring to the API in every OD in the whole country will be lower than 1. CNM will continue to lead national coordination and surveillance for elimination activities. CSOs will provide technical assistance according to their respective technical competencies and areas of expertise. There will not be a geographical phasing in MEAF 2021 – 2025, but rather activities will be conducted based on the operational stratification as shown in the Table 2 of 4.1 Stratification.

Figure 14 shows the baseline of ODs with no or low levels of malaria, and Figure 15 displays projected goals of when provinces with increased API should reach a target of API < 1 over the next five years to achieve full elimination by 2025.



Figure 14: Operational districts by low and increased API, baseline in 2019

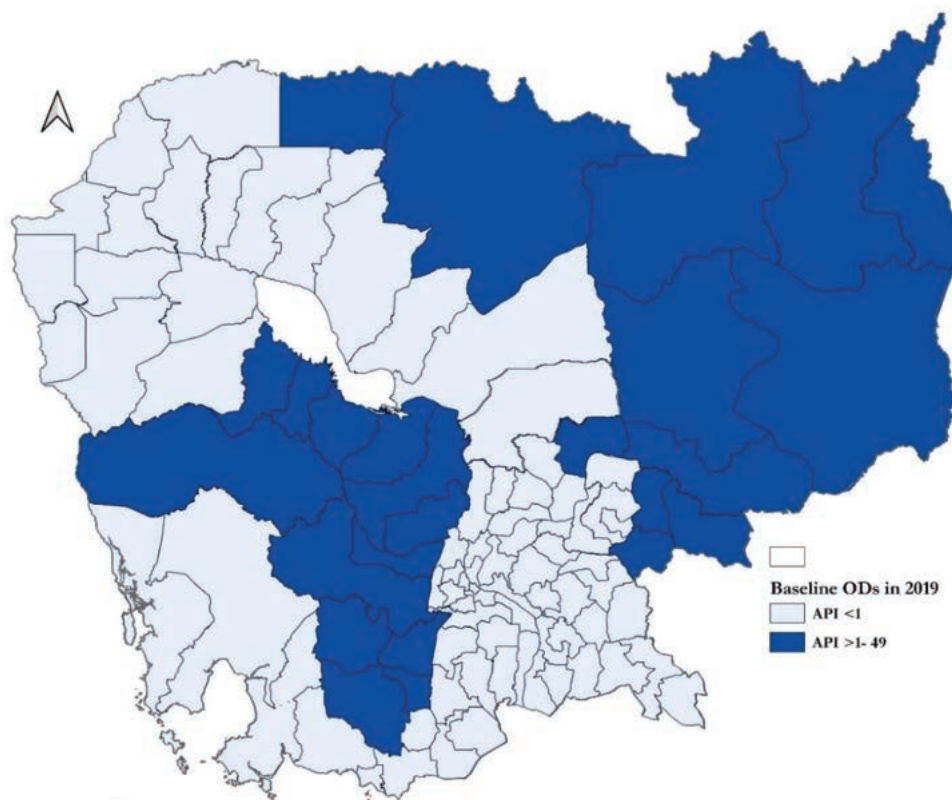
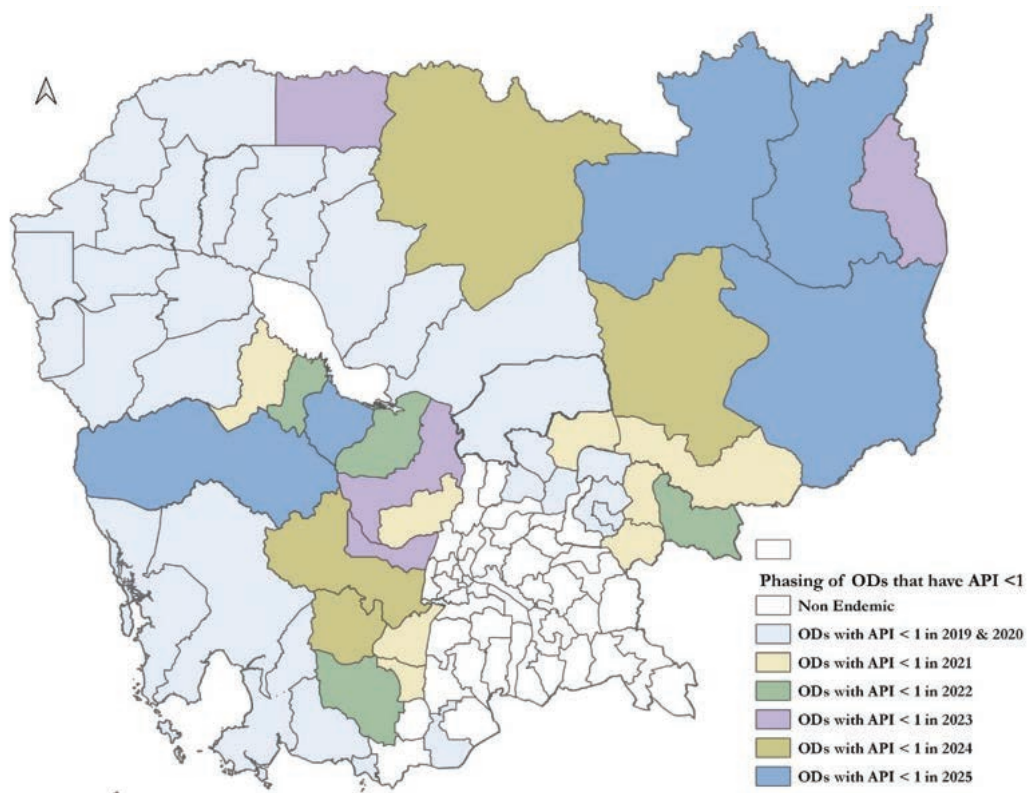


Figure 15: Geographical timeline of goals for operational districts to reach API < 1



Based on the baseline data, the estimated elimination ODs in endemic areas (53 ODs in total) in each phase are listed as below.

Phase / Year	Estimated No. of ODs	Name of ODs
ODs with API < 1 in 2019 & 2020	28	Preah Net Preah; Thma Puok; Kralanh; Kirivong; Thma Koul; Poipet; Siemreap; Kampong Cham - Kg. Siem; Angkor Chhum; Prey Chhor; Samraong; Battambang; Kampot; Kroch Chhmar; Pailin; Sampov Luon; Baray and Santuk; Sot Nikum; Kep; Tbong Khmum; Smach Mean Chey; Chamkar Leu; Stong; Preah Sihanouk; Kampong Thom; Suong; Maung Russei; Srae Ambel
Additional ODs with API <1 in 2021	8	Chhlong; Dambae; Ponhea Krek; Steung Trang; Kampong Tralach; Ang Rokar; Kong Pisey; Bakan
Additional ODs with API <1 in 2022	4	Memut; Chhouk; Sampov Meas; Kampong Chhnang
Additional ODs with API <1 in 2023	4	Borkeo; Anlong Veng; Boribo; Ou Dongk
Additional ODs with API <1 in 2024	4	Tbeng Meanchey; Kampong Speu; Kratie; Phnom Srouch
Additional ODs with API <1 in 2025	5	Banlung; Krokro; Steung Treng; Krovanh; Sen Monorom

4.3 Microplan

The strategic plan for the MEAF (2021 – 2025) is divided into three objectives and Enabling Environment, which serve as the pillars for the operational plan. The objectives are further detailed into strategies, which are constituted of activities and sub-activities needed to achieve the goal. Table 3 illustrates the implementation plan to the level of activities. These were developed and agreed upon by CNM in consultation with its partners. In addition, a timeline for each activity was determined for the first three years of implementation, by quarter.



Table 3: Micro plan of operational activities for 2021 – 2025

OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPLE- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Goal: By 2025, eliminate all forms of malaria, maintain zero mortality, and prevent reintroduction of malaria and multi-drug resistance														
Objective 1 Early detect, effectively and safely treat 100% of cases, and provide effective personal protection to at least 90% of the high risk population														
Strategy 1.1: Ensure all suspected malaria patients receive a parasitological test within 48 hours of symptom onset and all patients with confirmed malaria receive first-line anti-malarial treatment and other treatment regimens according to National Treatment Guidelines														
1.1.1 Update National Malaria Diagnosis and Treatment Guidelines	CNM	WHO	x									x		
1.1.2 Ensure all health service providers have adequate stock of malaria diagnostics and anti-malarial drugs	CNM	PSM, UNOPS, Partners	x				x					x		
1.1.3 Optimize and conduct training to all health facilities on diagnosis and treatment of uncomplicated and severe malaria	CNM, PHD, OD	WHO, Partners, HF		x									x	
1.1.4 Monitor, mentor and supervise all healthcare providers to improve the case management quality and compliance to the NTG	CNM, PHD, OD	HF	x	x	x	x	x	x	x	x	x	x	x	x
1.1.5 Integrate the testing and treatment of malaria and other bacterial diseases in health facilities	CNM	WHO, Partners							x	x		x	x	x
1.1.6 Optimize the procurement, distribution, and maintenance of microscopy network	CNM	PSM, UNOPS, Partners	x				x					x		
1.1.7 Explore new diagnostic tools and treatment for P.v radical cure	CNM	WHO Partners	x	x	x	x	x	x	x	x				
1.1.8 Ensure all patients have completed treatment regimes	CNM, HF	PHD, OD, VMW/MMW Partners	x	x	x	x	x	x	x	x		x	x	x
1.1.9 Strengthen pharmacovigilance and conduct activities for adverse event management	CNM	WHO, DDF, Partners, Hospitals	x		x		x					x		
Strategy 1.2: Ensure all patients with confirmed severe malaria are treated according to National Treatment Guidelines														
1.2.1 Ensure all severe malaria cases are referred by VMWs and MMWs	CNM, HF	VMW/MMW	x	x	x	x	x	x	x	x		x	x	x
1.2.2 Ensure all hospitals to have adequate stock of injection artesunate	CNM	PSM, UNOPS	x				x					x		
1.2.3 Optimize and conduct cascade training to hospitals on treating severe malaria	CNM	Hospitals						x						
1.2.4 Improve monitoring, mentoring and supervision of all eligible healthcare providers for severe malaria	CNM, PHD		x	x	x	x	x	x	x	x		x	x	x



OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPL- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy 1.3: Ensure all targeted villages are achieving full coverage of diagnosis and treatment for all confirmed cases within 48 hours of symptom onset by community networks (VMW/MMW)														
1.3.1 Utilize risk stratification to identify villages with strategies for maintaining VMW network	CNM, PHD, OD, HC	VMW/MMW Partners	x				x				x			
1.3.2 All VMW attend meeting and receive training on malaria, case management, counselling and health education	VMW/MMW CNM, PHD, OD, HC	Partners	x	x	x	x	x	x	x	x	x	x	x	x
1.3.3 VMW provide malaria prevention and case management services to resident villagers and to mobile populations in nearby areas	VMW/MMW	CNM	x	x	x	x	x	x	x	x	x	x	x	x
1.3.4 Conduct monitoring, mentoring and supervision for VMW activities	CNM, PHD, OD	Partners	x	x	x	x	x	x	x	x	x	x	x	x
Strategy 1.4: Ensure all suspected malaria patients from private sector providers are referred to a public sector facility														
1.4.1 Conduct regular supervision visits to private health providers to ensure the effective referral	CNM	DDF	x	x	x	x	x	x	x	x	x	x	x	x
1.4.2 Implement IEC/BCC activities for PPM to correctly conduct referral of suspected cases	CNM	Partners	x	x			x	x			x	x		
Strategy 1.5: Ensure all national, provincial and referral hospitals, and testing labs are qualified for malaria services and comply with quality assurance guidelines														
1.5.1 Review, update and disseminate the Malaria Diagnosis Quality Control and Assurance Guidelines and Standard Operating Procedures	CNM, WHO						x							
1.5.2 Ensure the stock of laboratory materials and strengthen capacity of blood sample collection	CNM	PSM, UNOPS	x	x	x		x	x	x		x	x	x	
1.5.3 Collect slides from participating labs in every province for EQA- Proficiency Panels for microscopy	CNM	WHO						x				x		
1.5.4 Conduct routine Microscopy Cross-checking exercises at national, provincial and referral hospitals	CNM	Hospitals	x	x	x	x	x	x	x	x	x	x	x	x
1.5.5 Conduct microscopy accreditation for central lab	CNM, WHO			x	x			x	x			x	x	
1.5.6 Conduct QC- Lot Testing for anti-malarial drugs at central level	CNM, WHO	UNOPS	x	x			x	x			x	x		
1.5.7 Monitor implementation of the quality assurance mechanism	CNM		x	x									x	x
Strategy 1.6: Test and regularly monitor malaria drug efficacy														
1.6.1 Implement TES/iDES studies to monitor drug resistance	CNM, WHO		x				x				x			
1.6.2 Monitor drug resistance markers through PCR tests nationwide	CNM			x				x				x		



OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPLE- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy 1.6: Test and regularly monitor malaria drug efficacy														
1.6.3 Conduct workshop to update TES/iDES results	CNM, WHO	Partners	x				x				x			
Strategy 1.7: Improve the uptake of malaria interventions for case management and prevention through IEC/BCC														
1.7.1 Update IEC/BCC Strategy and implementation guide	CNM	Partners	x				x				x			
1.7.2 Design, develop and distribute IEC/BCC materials	CNM	Partners	x	x			x	x			x	x		
1.7.3 Mass media Campaign	CNM	Partners	x	x	x	x	x	x	x	x	x	x	x	x
1.7.4 Train health and other department staff and volunteers on IEC/BCC Guidelines	CNM	Partners		x		x		x		x		x		x
1.7.5 Conduct ongoing planning and delivery of health education through multi-channels at different levels	CNM	Partners	x	x	x	x	x	x	x	x	x	x	x	x
1.7.6 Conduct monitoring and supervision to measure the effectiveness of IEC/BCC implementation and campaign	CNM	Partners	x	x	x	x	x	x	x	x	x	x	x	x
Strategy 1.8: Achieve full coverage of at-risk population with appropriate personal protection and vector control tools														
1.8.1 Update vector management strategy	CNM, WHO		x				x				x			
1.8.2 Conduct coverage exercise to identify malaria transmission locations and inform quantification and distribution strategy of LLIN/LLIHN for villages at risk	CNM		x				x				x			
1.8.3 Estimate the overall quantity of LLIN/LLIHN and vector control tools needed	CNM	PHD, OD, HC, Partners	x											
1.8.4 Procure and distribute LLIN/LLIHN and other required equipment to peripheral health facilities	CNM	UNOPS	x	x										
1.8.5 Distribute LLIN/LLIHN to all at-risk populations through mass distribution campaign	CNM, HC, VMW/MMW	Partners		x	x									
1.8.6 Continuously distribute LLIN/LLIHN to at-risk villages reporting low LLIN/LLIHN ownership	CNM, HC, VMW/MMW	Partners	x	x	x	x	x	x	x	x	x	x	x	x
1.8.7 Monitor LLIN/LLIHN mass distribution campaign via rapid assessment	CNM	WHO			x	x								
1.8.8 Supervise and monitor LLIN/LLIHN continuous distribution	CNM		x	x	x	x	x	x	x	x	x	x	x	x
1.8.9 Conduct IEC/BCC for correct usage of vector control interventions	CNM	Partners	x	x	x	x	x	x	x	x	x	x	x	x

OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPLE- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy 1.9: Strengthen entomological surveillance of vector-borne diseases with integrated vector management														
1.9.1 Build capacity of CNM's entomology Unit	CNM		x								x			
1.9.2 Train CNM entomology staff	CNM		x	x	x	x	x	x	x	x	x	x	x	x
1.9.3 Procure Equipment for entomological surveillance	CNM	PSM, UNOPS	x				x				x			
1.9.4 Collect vector samples at sentinel sites and monitor receptivity and vector density in non-active foci where transmission has been interrupted (no local cases)	CNM		x	x	x	x	x	x	x	x	x	x	x	x
1.9.5 Maintain insectary for lab study of mosquitos	CNM		x	x	x	x	x	x	x	x	x	x	x	x
1.9.6 Analyze entomological samples and related data in entomology laboratory	CNM		x	x	x	x	x	x	x	x	x	x	x	x
1.9.7 Map vector distribution, transmission foci and vector control interventions	CNM		x	x			x	x			x	x		
Strategy 1.10: Monitor insecticide resistance routinely														
1.10.1 Procure supplies for insecticide resistance monitoring	CNM	PSM, UNOPS	x				x				x			
1.10.2 Monitor insecticide resistance for malaria vector and other vector-borne	CNM		x	x	x	x	x	x	x	x	x	x	x	x
1.10.3 Monitor efficacy of vector control tools on field mosquitoes	CNM		x	x	x	x	x	x	x	x	x	x	x	x
Objective 2: Intensify focal interventions to interrupt transmission in endemic locations with highest risk (including mobile migrant population / forest goers) to reach API less than 0.1 for Plasmodium falciparum by 2020 and all species by 2025														
Strategy 2.1: Utilize risk stratification and mapping to identify and monitor hotspots and deploy intensified network of MMW														
2.1.1 Utilize risk stratification to identify hotspots and MMW locations	CNM	Partners	x				x				x			
2.1.2 Conduct regular mobile migrant mapping analysis and optimize location of MMW	CNM, MMW	Partners		x				x				x		
2.1.3 Conduct operational research to better understand and reach MMP and forest goers	CNM	Partners		x				x				x		
Strategy 2.2: Conduct training for MMW in high-burden hotspot areas														
2.2.1 Optimize and conduct cascade training to all MMW	CNM	PHD, OD HC, MMW		x	x			x	x			x	x	
2.2.2 Ensure participation of MMW to VMW/MMW monthly meeting	MMW	CNM	x	x	x	x	x	x	x	x	x	x	x	x



OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPLE- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy 2.3: Ensure all confirmed cases among MMP and other underserved populations are diagnosed and treated within 48 hours of symptom onset														
2.3.1 Ensure all MMW to have adequate stock of diagnostics, treatment, and malaria-related stock	CNM	MMW, PSM, UNOPS	x			x	x			x	x			x
2.3.2 MMW to conduct passive case detection in high-transmission posts, hotspots and forest entry points	MMW	CNM	x	x	x	x	x	x	x	x	x	x	x	x
2.3.3 Identify and access other informal sector forest-goers and co-travelers	MMW	CNM	x	x	x	x	x	x	x	x	x	x	x	x
Strategy 2.4: Foster interventions to impact infection reservoir in high risk locations and communities														
2.4.1 Update guidelines for impacting infection reservoir for MMP	CNM	WHO	x									x		
2.4.2 Develop new GPS tool to present malaria cases on mobile application to help with geographical orientation during outreach visits	CNM		x			x	x			x	x			x
2.4.3 Conduct interventions to impact infection reservoir	MMW, CNM	WHO	x	x	x	x	x	x	x	x	x	x	x	x
Strategy 2.5: Ensure monitoring, mentoring and supervision for MMW activities in high-burden hotspot areas														
2.5.1 Collect routine data on progress of interventions MMW administered MMP questionnaires	CNM	MMW	x	x	x	x	x	x	x	x	x	x	x	x
2.5.2 Implement data review and feedback incorporation at all supervision levels and central level	CNM	Partners, HC, MMW	x	x	x	x	x	x	x	x	x	x	x	x
2.5.3 Improve and conduct monitoring and supervision for MMW activities	CNM, PHD, OD, HC	MMW	x	x	x	x	x	x	x	x	x	x	x	x
Strategy 2.6: Foster collaborative effort between health centers and authorities to better track and target MMPs to provide preventive and curative services														
2.6.1 Expand and maintain functional partnership with relevant parties present in the forest	CNM	Partners	x				x				x			
2.6.2 Provide pre- and post-deployment malaria screening for all RCAF peacekeeper and other security personnel	CNM		x	x	x	x	x	x	x	x	x	x	x	x
Strategy 2.7: Create awareness and adapt behaviors by MMP and forest goers, and improve community mobilization through IEC/BCC strategies														
2.7.1 Design, develop and distribute IEC/BCC materials for high-burden areas	CNM	Partners	x				x				x			
2.7.2 Train health and other department staffs and volunteers on IEC/BCC guidelines targeting high-burden areas	CNM	Partners		x								x		
2.7.3 Conduct community mobilization sessions in high-burden areas	CNM	Partners		x	x			x	x			x	x	
2.7.4 Conduct monitoring and evaluation on IEC/BCC intervention in high-burden areas	CNM, PHD, OD, HC	Partners	x	x	x	x	x	x	x	x	x	x	x	x



OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPL- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy 2.8: Provide personal protection and appropriate vector control tools to MMPs and forest goers														
2.8.1 Determine, quantify, and distribute appropriate personal protection and vector control tools	CNM	WHO, PSM, UNOPS	x	x	x	x	x	x	x	x	x	x	x	x
2.8.2 Explore and test innovative vector control strategies in Cambodian context	CNM	WHO	x	x	x	x	x	x	x	x	x	x	x	x
Objective 3: Investigate, clear, document and follow-up 100% of cases and foci to interrupt transmission and prevent re-establishment														
Strategy 3.1: Strengthen capacity for managing, monitoring and supervising all surveillance activities														
3.1.1 Develop and regularly update all surveillance guidelines and SOP	CNM, WHO	Partners	x				x				x			
3.1.2 Train all PHD, OD, HC and VMW/MMW on surveillance protocols and reporting application	CNM	Partners				x								x
3.1.3 Conduct integrated surveillance supervision visits	CNM, PHD, OD	Partner, HC	x	x	x	x	x	x	x	x	x	x	x	x
Strategy 3.2: Regularly upgrade system specifications, functions, and features of Malaria Information System (MIS) to improve visualization, interpretation, and usage of data at all levels														
3.2.1 Maintain necessary hardware and upgrade central and peripheral-level software in line with new MIS system specifications	CNM		x	x			x	x			x	x		
3.2.2 Update risk stratification on an annual basis	CNM	Partners	x				x				x			
3.2.3 Develop new applications and modules for geolocation data and mapping within MIS	CNM		x					x				x		
3.2.4 Develop, update and maintain electronic data collection tools for surveillance activities	CNM			x				x				x		
3.2.5 Develop new features to strengthen procurement and supply chain management	CNM			x				x				x		
3.2.6 Develop modelling features within MIS with workshop to review the implementation	CNM				x				x				x	
3.2.7 Develop and implement patient ID features in MIS	CNM				x				x				x	
3.2.8 Develop new applications and integrate critical functions such as electronic SMART supervision checklist, private sector referrals and insecticide resistance data into MIS	CNM				x	x			x	x			x	x
Strategy 3.3: Improve processes, tools, and trainings to ensure all levels submit complete and accurate reports on time														
3.3.1 Equip all HC and VMW/MMW with necessary tools and systems to conduct reporting	CNM	HC, VMW/MMW		x		x								



OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPLE- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy 3.3: Improve processes, tools, and trainings to ensure all levels submit complete and accurate reports on time														
3.3.2 Ensure all responsible staff at HC and VMW/MMW are trained on the accuracy, timeliness and completeness of reporting	CNM	HC, VMW/MMW				x				x				x
3.3.3 Conduct supervision and on-site data verification for better quality data management	CNM, PHD, OD			x	x	x	x	x	x	x	x	x	x	x
Strategy 3.4: Ensure all confirmed cases for all species are notified, investigated and classified within 24 hours, and responded within 3 days														
3.4.1 Update the SOP and forms for case notification, investigation and classification	WHO, CNM		x				x				x			
3.4.2 Procure and maintain/replace the necessary resources and systems to notify, investigate, and classify cases for all HC	CNM	OD, HC		x		x								
3.4.3 Develop, update and maintain application for electronic data collection for case investigation and response within MIS	CNM		x				x				x			
3.4.4 Train PHD/OD/HC on case investigation protocols and reporting application	CNM	PHD, OD, HC				x								x
3.4.5 Investigate all the cases by HC staffs and VMW/MMW for all species	HC, VMW/MMW	CNM	x	x	x	x	x	x	x	x	x	x	x	x
3.4.6 Conduct case response within 3 days after case classification	HC, VMW/MMW	CNM	x	x	x	x	x	x	x	x	x	x	x	x
3.4.7 Conduct supervision for case investigation and response	CNM, PHD, OD		x	x	x	x	x	x	x	x	x	x	x	x
Strategy 3.5: Investigate and classify all new active foci within 7 days														
3.5.1 Update the SOP and forms for foci investigation and response	WHO, CNM		x				x				x			
3.5.2 Procure and maintain necessary tools and systems to equip all HC and OD to conduct foci investigation	CNM	OD, HC		x		x								
3.5.3 Develop, update and maintain application for electronic data collection for foci investigation and response within MIS	CNM		x				x				x			
3.5.4 Train PHD/OD/HC on foci investigation protocols and reporting application	CNM	PHD, OD, HC				x								x
3.5.5 Conduct foci investigation within 7 days after local cases are detected	CNM, PHD, OD, HC		x	x	x	x	x	x	x	x	x	x	x	x



OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPLE- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy 3.6: Implement interventions to stop transmission in active foci														
3.6.1 Conduct foci review meeting to analyze the data collected and determine drivers of transmission and select responses	WHO, CNM		x	x	x	x	x	x	x	x	x	x	x	x
3.6.2 Conduct mop-up activities to deployed interventions and vector control tools to reduce the potential for continued malaria transmission for all active foci	PHD, OD, HC, VMW	CNM	x	x	x	x	x	x	x	x	x	x	x	x
3.6.3 Conduct monitoring and supervision for all foci activities	CNM, PHD, OD		x	x	x	x	x	x	x	x	x	x	x	x
Strategy 3.7: Detect and respond to all outbreaks within 7 days														
3.7.1 Review and revise the existing outbreak detection system and response guidelines	WHO, CNM		x								x			
3.7.2 Monitor monthly case load and abnormal signals at HC and OD level	CNM	OD, HC	x	x	x	x	x	x	x	x	x	x	x	x
3.7.3 Conduct rapid outbreak investigation	Outbreak Respond Team		x	x	x	x	x	x	x	x	x	x	x	x
3.7.4 Implement outbreak response	Outbreak Respond Team		x	x	x	x	x	x	x	x	x	x	x	x
Objective 4: Strengthening program leadership to maintain effective program management and coordination at central and provincial levels and harness innovation and research														
Strategy 4.1: Strengthen program leadership and coordination within country, regionally, and globally														
4.1.1 Activate malaria elimination coordination at all levels for joint data review, decision making, escalation of gaps and management leadership	CNM, PHD, OD	MoH	x	x	x	x	x	x	x	x	x	x	x	x
4.1.2 Improve the coordination between donors, partners and implementers	CNM	Partners	x	x	x	x	x	x	x	x	x	x	x	x
4.1.3 Conduct cross-border meeting to regularly share information of mutual interest at national and provincial/district levels with neighboring countries	CNM, OD	Partners	x	x	x	x	x	x	x	x	x	x	x	x
4.1.4 Allocate malaria posts appropriately to monitor cross-border malaria-related activities basing on criteria and stratification results	CNM	Partners	x	x	x	x	x	x	x	x	x	x	x	x
4.1.5 Participate in regional forums for advocacy and synchronizing implementation of all malaria activities with neighboring countries	CNM	APLMA, APMEN, Partners		x	x	x		x	x	x		x	x	x
4.1.6 Participate in global forums to share results from Cambodia and incorporate the latest global best practices into program planning	CNM					x				x				x

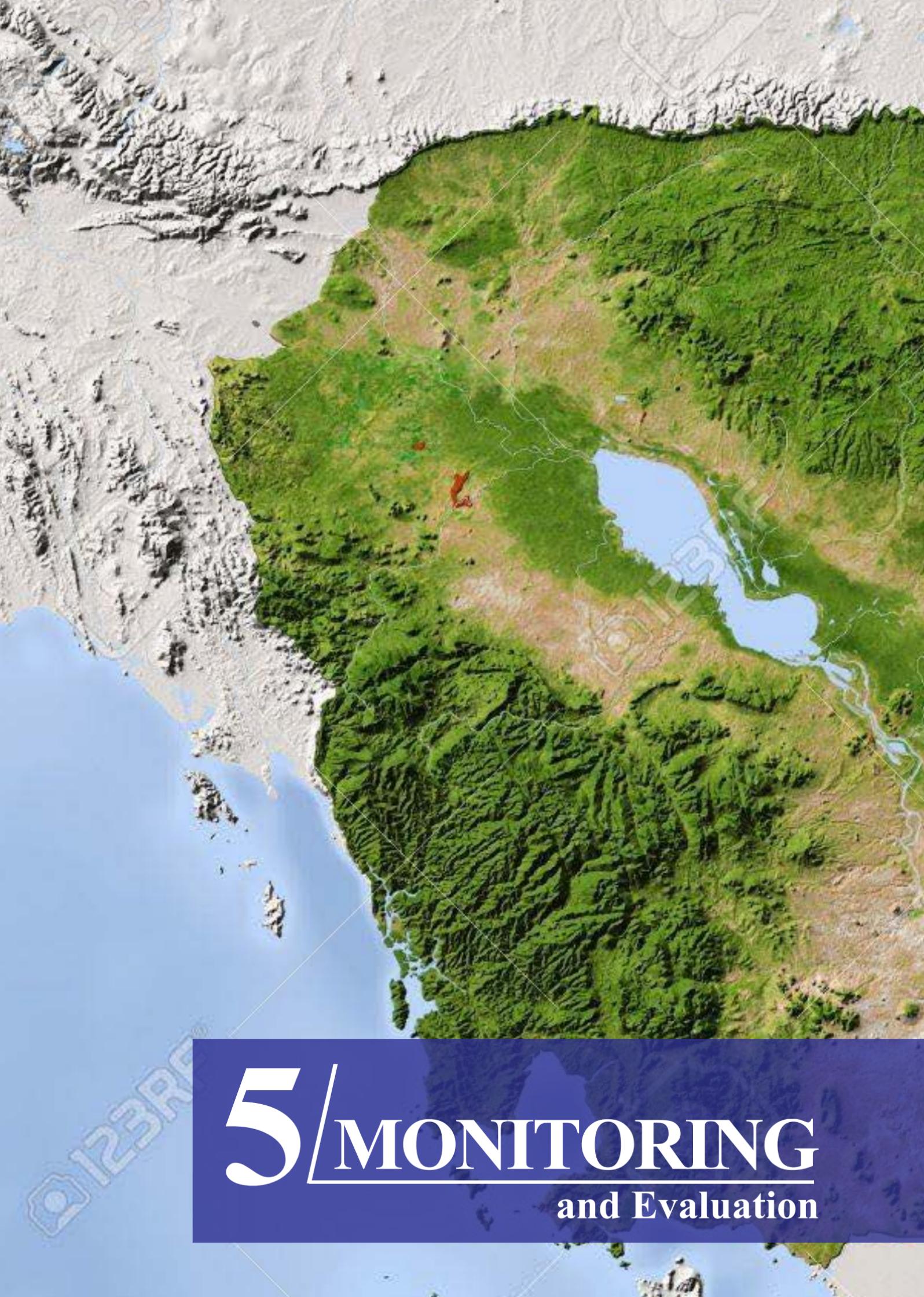


OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPLE- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy 4.2: Strengthen planning, program management and execution at CNM and subnational levels														
4.2.1 Regularly update human resource development plan	CNM		x				x				x			
4.2.2 Procure equipment and strengthen administration for CNM to improve working efficiency	CNM		x				x				x			
4.2.3 Procure equipment and strengthen administration for other related departments to improve working efficiency	CNM					x								
4.2.4 Develop performance-based reward strategy to improve the effectiveness of management and implementation of malaria related activities	CNM		x	x			x				x			
4.2.5 Conduct refresher training for all malaria-dedicated staff on program management, planning, and technical guidance for malaria elimination	CNM	PHD, OD	x		x		x				x			
4.2.6 Appoint senior management team/staff to be focal points to oversee and monitor the progress by geographic locations	CNM		x	x	x	x	x	x	x	x	x	x	x	x
4.2.7 Develop detailed annual work plans and budgets at central and subnational level	CNM	PHD, OD	x		x	x	x		x	x	x		x	x
4.2.8 Conduct regular meetings of the operations coordination group for CNM and partners to analyze activity implementation and fund absorption	CNM	UNOPS, Partners	x	x	x	x	x	x	x	x	x	x	x	x
4.2.9 Conduct regular Technical Working Group meetings	CNM			x		x		x		x		x		x
Strategy 4.3: Strengthen financial management capacity at CNM and subnational levels														
4.3.1 Develop financial management guidelines for different sources of grants for all activities	CNM	Donors, Partners	x				x				x			
4.3.2 Improve the quality and timeliness of the financial report	CNM	PHD, OD	x	x	x	x	x	x	x	x	x	x	x	x
4.3.3 Improve/update the risk management and compliance	CNM	PHD, OD	x	x	x	x	x	x	x	x	x	x	x	x
Strategy 4.4: Strengthen Procurement and Supply Management Systems (PSM)														
4.4.1 Expert review and supervision of procurement and supply management system	CNM	CMS, PSM, Partners		x							x			
4.4.2 Facilitate registration, importation and the use of new product	CNM	DDF	x	x	x	x	x	x	x	x	x	x	x	x



OBJECTIVE/STRATEGY/ACTIVITY	PRIMARY IMPL- MENTER	SUPPORT PARTNER	2021				2022				2023			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy 4.4: Strengthen Procurement and Supply Management Systems (PSM)														
4.4.3 Improve tools in MIS for the functions related to malaria commodities at central and subnational level	CNM		x		x		x		x		x		x	
4.4.4 Strengthen CNM and CMS coordination	CNM	CMS	x	x	x	x	x	x	x	x	x	x	x	x
4.4.5 Strengthen PSM through regular review of challenges and solutions through PSM Sub Working Group forum	CNM	UNOPS, CMS, WHO, PSM, Partners	x	x	x	x	x	x	x	x	x	x	x	x
4.4.6 Strengthen stock management in central and subnational level	CNM	Partners	x	x		x	x	x		x	x	x		x
4.4.7 Manage fix assets at national and subnational level	CNM	PHD, OD	x	x	x	x	x	x	x	x	x	x	x	x
Strategy 4.5: Advocate for high level political commitment to malaria elimination														
4.5.1 Establish malaria as a notifiable disease	CNM	MoH, Partners	x	x	x	x								
4.5.2 Conduct Annual Strategy Review Meeting to identify operational gaps and update strategy	CNM, PHD, OD	Partners	x				x				x			
4.5.3 MOH participates in World Malaria Day events to raise the profile of malaria as a national priority	CNM, PHD	MoH, Partners		x				x				x		
Strategy 4.6: Research and development to respond to existing and new challenges														
4.6.1 Determine research priorities for the next 5 years	CNM	Partners, WHO	x		x		x		x		x		x	
4.6.2 CNM action research focal points develop a database/master list of all ongoing projects with expected timelines and use to inform future program decision making	CNM	Partners	x				x				x			
4.6.3 Strengthen the relationship between CNM and action research partners	CNM	Partners	x	x	x	x	x	x	x	x	x	x	x	x
Strategy 4.7: Transition from a vertically funded programmatic approach to a sustainable whole-of-health system approach														
4.7.1 Establish WHO certification processes and protocols	WHO, CNM		x	x	x	x	x	x	x	x	x	x	x	x
4.7.2 Integration of VMW	CNM	VMW, MoH	x	x	x	x	x	x	x	x	x	x	x	x
4.7.3 Develop and implement integrated vector management	CNM, WHO	Partners			x			x				x		
4.7.4 Explore external and innovative financing aside from existing funding sources	CNM	Partners, MoH		x	x	x		x	x	x		x	x	x





5/MONITORING
and Evaluation



5. Monitoring and Evaluation

To ensure continual progress toward the goal of malaria elimination, the implementation of all intervention areas will be regularly monitored and critically evaluated. The purpose of the monitoring and evaluation system is to track the execution of the MEAF (2021 – 2025), measure whether the set objectives are being met according to the proposed timelines, and enable the effective oversight of the malaria program. Monitoring the framework’s objectives on a routine basis will allow CNM to identify which activities are successfully implemented and which require additional support (financial or technical). By allowing managers and implementers to understand the impact, outcomes, and outputs of the implemented interventions, the M&E system promotes evidence-based decision-making. Through proper interpretation of the collected data corrective action can be taken to improve ineffective practices and best practices can be implemented across multiple intervention areas. The M&E component of the MEAF (2021 – 2025) will be the joint responsibility of CNM and the implementing partners.

Several indicators have been identified to monitor the impact, outcomes and coverage of the national strategy. The table below shows the indicator framework from the Monitoring and Evaluation Plan (2021 – 2025) by which the implementation of the MEAF (2021 – 2025) will be assessed. It outlines the key indicators to monitor and evaluate the progress on specific objectives in MEAF (2021 – 2025).

Reporting under the M&E plan will be the joint responsibility of CNM and implementing partners. The main source of data for indicators will be routine data collection systems, real-time case-based and entomological surveillance systems to be managed under the MIS, an IEC/BCC survey to determine health seeking behavior of MMPs (2022), an assessment on categorizing the risks of malaria transmission of MMPs (2022 and 2024), and surveys on LLI(H)N (2021 and 2024) and repellent (2022 and 2024) distribution and usage. A Mid-Term Evaluation of the Strategic Plan will be conducted in 2022 and a MPR will be conducted in 2024.

Key data from the implementing partners for indicators in the M&E plan will be collected and visualized through the MIS. Based on the indicator, data collection and reporting will occur on a daily, monthly, quarterly, and annual basis. Targets for the indicator framework in the M&E Plan are set on an annual basis and are not cumulative. The M&E Indicator Framework for the MEAF (2021 – 2025) is described in the table on the following page.



Monitoring and Evaluation Indicator Framework 2021 – 2025

Impact Indicators	Disaggregated By	Baseline (2019)	Timeline					Data Source	Frequency	
			2021	2022	2023	2024	2025			
GOAL: By 2025, eliminate all forms of malaria, maintain zero mortality, and prevent reintroduction of malaria and multi-drug resistance										
Test positivity rate: Percentage of positive malaria tests for all species	HF, VMW/MMW, PHD, OD	5.32	1.45	0.76	0.41	0.21	0	MIS	Monthly	
		1.95	0.59	0.35	0.21	0.08	0	MIS	Monthly	
Annual Parasite Incidence: Number of local malaria cases for all species per 1,000 population	PHD, OD									
Annual Plasmodium falciparum Incidence: Number of local Plasmodium falciparum and mixed malaria cases per 1,000 population	PHD, OD	0.31	0.06	0.01	0	0	0	MIS	Monthly	
In-patient severe malaria rate per 10,000 population	Sex, PHD, OD	0.2	0.06	0.04	0.02	0.01	0	MIS	Monthly	
In-patient mortality rate per 100,000 population	Sex, Age, PHD, OD	0	0	0	0	0	0	MIS	Monthly	
Number of Operational Districts (ODs) that have malaria API less than 1 per 1,000 population for all species	PHD, OD	75% (77/102)	83% (85/102)	87% (89/102)	91% (93/102)	95% (97/102)	100% (102/102)	MIS	Annually	
Number of Operational Districts (ODs) that have malaria API less than 1 per 1,000 population for P. falciparum and mixed	PHD, OD	90% (92/102)	94% (96/102)	96% (98/102)	98% (100/102)	100% (102/102)	100% (102/102)	MIS	Annually	
Percentage of cases that are classified as indigenous (L1-L3)	Species, Province/OD	53.44%	40%	35%	30%	15%	0%	MIS	Annually	
Number of active foci (village with L1 case)	Species, Province/OD	Not available	71	14	3	0	0	MIS	Annually	

Indicators	Disaggregated By	Baseline (2019)	Timeline					Data Source	Frequency	
			2021	2022	2023	2024	2025			
1 Objective 1 Early detect, effectively and safely treat 100% of cases, and provide effective personal protection to at least 90% of the high risk population										
Percentage of at-risk villages covered by a VMW	PHD, OD	99%	>99%	>99%	>99%	>99%	>99%	MIS	Quarterly	
Annual blood Examination Rate: Number of parasitological tests carried out per 100 endemic population	Microscopy/RDT, HF, VMW/MMW, PHD, OD, PCD/ACD	6	7	8	9	10	10	MIS	Monthly	
Annual blood Examination Rate: Number of parasitological tests carried out per 100 population	Microscopy/RDT, HF, VMW/MMW, PHD, OD, PCD/ACD	3.2	4	4	4	4	4	MIS	Monthly	
Percentage of total Plasmodium falciparum and mix cases that received treatment according to NTG	ACT/PQSD, HF, VMW/MMW, PHD, OD	95% (only P.f)	>95%	>95%	>99%	>99%	100%	MIS	Monthly	
Percentage of total Plasmodium vivax cases that received treatment according to NTG	G6PD status, ACT/PQRC, HF, VMW/MMW, PHD, OD	Not available	60%	75%	85%	>95%	100%	MIS	Monthly	
Percentage of care providers with adequate case management practices observed during supervision to VMW/MMW (high QA checklist score >80%)	VMW/MMW	Not available	75%	85%	90%	>95%	>95%	MIS	Quarterly	
Percentage of points of care with a closing balance of sufficient stock (defined as between 0.5 to 3 AMC) of diagnostic supplies with viable stock	Microscopy/RDT, HF, VMW/MMW, PHD, OD	Not available	>95%	>95%	99%	99%	99%	MIS	Monthly	
Percentage of points of care with a closing balance of sufficient stock (defined as between 0.5 to 3 AMC) of first-line antimalarials (ACT/PQ)	ACT/PQ, HF, VMW/MMW, PHD, OD	Not available	>95%	>95%	99%	99%	99%	MIS	Monthly	

Indicators	Disaggregated By	Baseline (2019)	Timeline					Data Source	Frequency	
			2021	2022	2023	2024	2025			
1 Objective 1 Early detect, effectively and safely treat 100% of cases, and provide effective personal protection to at least 90% of the high risk population										
Percentage of TES/iDES completed according to targets	Site	100%	100%	100%	100%	100%	100%	TES/iDES	Monthly	
Percentage of microscopist that receiving valid NCA accreditation (grade A&B)	NRH/PRH/DRH, PHD	36% (2018)	NA	70%	NA	90%	NA	CNM Lab unit	every 2 years	
Percentage of population in targeted hotspots who slept under an insecticide-treated net (ITN) during the previous night after LLIN Mass Campaign	Sex	86%	>90%	NA	NA	>90%	NA	Quick LLIN assessment	every 3 years	
Percentage of households in targeted hotspots with at least one insecticide-treated net for every two people after LLIN Mass Campaign	ITN, LLIN	94%	80%	NA	NA	>90%	NA	Quick LLIN assessment	every 3 years	
Percentage of community mobilization session conducted in targeted villages with VMW	village	70%	85%	90%	95%	95%	95%	MIS	Quarterly	
2 Objective 2 Intensify focal interventions to interrupt transmission in endemic with highest risk (including mobile migrant population/forest goers) to eliminate Plasmodium falciparum by 2023 and all species by 2025										
Percentage of target hotspots (defined as high risk by CNM stratification) covered by MMW	PHD, OD	Not available	95%	95%	99%	99%	100%	MIS	Quarterly	
Percentage of community network (MMW/VMW) reaching the targets during active case detection	PHD, OD	70%	>85%	>90%	>95%	>95%	>95%	MIS/IP Scorecard	Monthly	
Percentage of forest goers in hotspots who reported sleeping under an ITN the last time they slept in the forest	PHD, OD, Sex	Not available	50%	75%	85%	90%	90%	MIS	Monthly	

Indicators	Disaggregated By	Baseline (2019)	Timeline					Data Source	Frequency	
			2021	2022	2023	2024	2025			
3 Objective 3 Investigate, clear, document and follow-up 100% of cases and foci to interrupt transmission and prevent re-establishment										
Percentage of expected monthly MIS case management reports submitted from public HFs (provincial hospitals, referral hospitals, health centers) with completeness	PHD, OD	99%	>99%	>99%	>99%	>99%	>99%	MIS	Monthly	
Percentage of expected monthly MIS stock reports submitted from public HFs (provincial hospitals, referral hospitals, health centers) with completeness	PHD, OD	98%	99%	>99%	>99%	>99%	>99%	MIS	Monthly	
Percentage of expected monthly MIS case management reports submitted from VMW/MMWs, with completeness	PHD, OD	98%	99%	>99%	>99%	>99%	>99%	MIS	Monthly	
Percentage of malaria cases notified, investigated and classified within 24h according to surveillance manual	PHD, OD	25%	80%	80%	90%	95%	100%	MIS	Monthly	
Percentage of cases investigated who were diagnosed within 24 hours after onset of symptoms	PHD, OD	12%	80%	80%	90%	95%	100%	MIS	Monthly	
Percentage of malaria cases responded within 7 days according to surveillance manual	PHD, OD	60%	70%	80%	90%	95%	100%	MIS	Monthly	
Percentage of new active foci classified and investigated according to surveillance manual	PHD, OD	Not available	80%	80%	90%	95%	100%	MIS	Monthly	
Percentage of investigated foci in which response was initiated according to surveillance manual	PHD, OD	Not available	80%	80%	90%	95%	100%	MIS	Monthly	



6/ BUDGET AND Financial Plan



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6. Budget and Financial Plan

6.1 Costing Methodology

To generate a robust estimated budget for activities delineated in the MEAF (2021-2025), an activity-based costing approach was carried out. Activities to contribute to each strategy were broken down into discrete sub-activities to be costed. The frequency and timelines for events and continuous activities were determined on a quarterly basis for the duration of the five-year timeframe. Resources required were determined for costed items in each strategy down to the sub-activity level. Unit cost inputs were standardized throughout the activities and were sourced from historical expenditure and active grant budgets for commodities, travel, and human resources.

6.2 Estimated Budget

The estimated cost of the MEAF over the next five years is approximately \$79,172,435. The costs can be analyzed based by each objective, with Objective 1 constituting an estimated 44% (\$35.1MM) of the total MEAF2 budget over the next five years. Most of the costs for Objective 1 are based on the community health worker program targeted in risk strata 3 and 4 accounting for an estimated \$9.7MM. This also includes Vector Control interventions, where the Malaria Program estimates an expenditure of \$10.6MM including procurement and distribution costs of LLIN and LLIHN for \$7.4MM.

The second largest cost component comes from Enabling Environment (\$20.4MM) which accounts for 26% of the budgetary requirement. Most of the costs are distributed between enabling a strong community health worker program in and around the border areas of Cambodia (\$2.4MM) and building the capacity of the malaria program through trainings, planning workshops and technical assistance at central, PHD and OD levels.

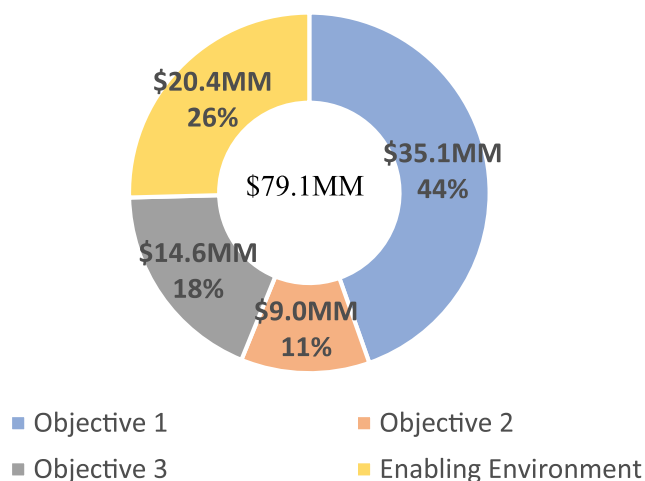
Objective 3 constitutes 18% of the overall budget with an estimated cost of \$14.6MM. Providing necessary tools and systems and building capacity of the health facilities and community network for timely and accurate data reporting account for \$7.6MM of the budget plan. This objective also includes surveillance activities like case investigation and response and foci investigation and response which together account for \$4.5MM over the next five years.

The remaining costs for the plan come from Objective 2, which is targeted at strata 5 with an intensified set of activities and vector control tools (\$9.0MM). The costs in this objective are concentrated in procuring forest packs (\$4.0MM) for distribution to forest goers as a means of focalized and effective coverage of this population with vector control tools.



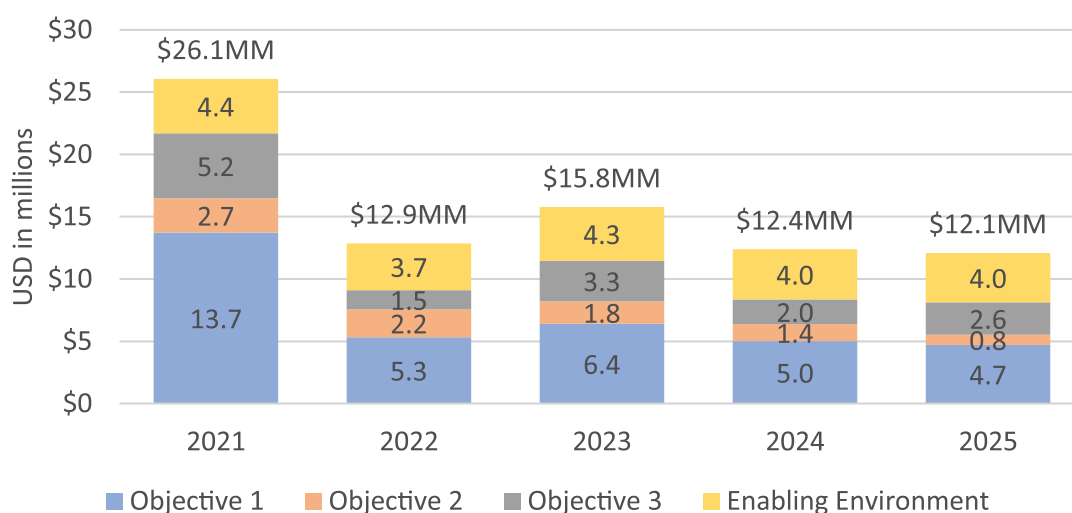
Figure 16 summarizes total spend by all objectives across the five-year period. Objective 1 and Objective 2 combined is 56% of the total plan depicting the investment expected to be made by the program in primarily case management, IEC/BCC and vector control interventions.

Figure 16: Total Spend by Objective for MEAF 2021 - 2025



In Figure 17, the costs are expected to decline over the years as reduction in API impacts the forecasts of quantities of interventions for each risk strata. High costs for 2021 are driven by higher quantity of community health workers, expected mass distribution of nets and major capacity building programs.

Figure 17: Annual Spend by Objective



All sub activities in the budget are classified into most relevant module areas. Case management (48%) and RSSH modules (25%) form most of the costs for the plan. Case management costs are higher in the first year due to major capacity building trainings planned across different interventions. These costs normalize starting in 2022 translating into an average programmatic case management implementation cost of approximately \$6MM.

Table 5: Modular Framework Categorization of MEAF2

Module	2021	2022	2023	2024	2025	Total
Case Management	\$12,441,386	\$7,134,321	\$7,617,885	\$5,700,517	\$5,624,865	\$38,518,975
Program Management	\$2,685,273	\$1,397,048	\$1,449,336	\$1,381,942	\$1,381,942	\$8,295,540
RSSH: Financial Management Systems	\$90,884	\$116,360	\$294,979	\$373,679	\$372,179	\$1,248,080
RSSH: Health Management Information Systems and M&E	\$2,783,754	\$171,938	\$1,699,914	\$1,186,991	\$1,694,241	\$7,536,838
RSSH: Health Products Management Systems	\$149,720	\$55,761	\$101,173	\$90,187	\$80,946	\$477,788
RSSH: Health Sector Governance and Planning	\$2,067,228	\$2,015,718	\$2,322,220	\$2,106,346	\$2,113,409	\$10,624,920
RSSH: Integrated Service Delivery and Quality Improvement	\$180	\$180	\$17,971	\$17,971	\$17,971	\$54,274
Specific Prevention Interventions	\$581,556	\$460,737	\$387,047	\$247,718	\$149,877	\$1,826,935
Vector Control	\$5,269,867	\$1,503,354	\$1,882,467	\$1,277,513	\$655,882	\$10,589,083
Total Spend	\$26,069,848	\$12,855,418	\$15,772,991	\$12,382,864	\$12,091,313	\$79,172,435



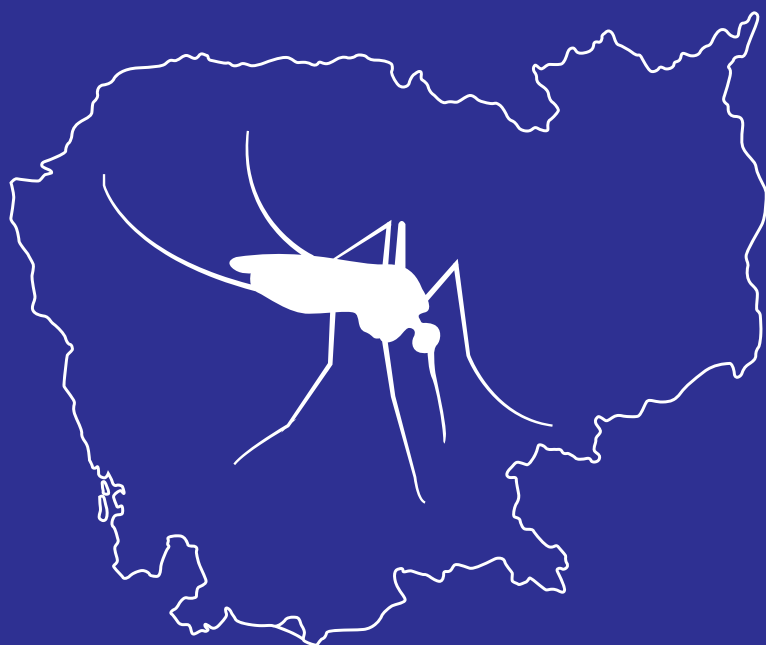
7. Annex

Annex 1. Process for MEAF 2021 – 2025 Development

Dates/Time Periods	Timeline	
	Meeting/Consultation	Description
Jul. 15 - 19	Malaria Program Review (MPR) Workshop	CNM, WHO and partners reviewed the performance of malaria program in MEAF 2016-2020
Sep. 10	Second Malaria Program Review (MPR) Workshop	CNM and WHO presented the findings from the review of MEAF 2016-2020
Oct. 8	Stratification Workshop	CNM and partners presented the stratification plan, and received feedbacks from partners
Oct. 9 - 10	Country Consultative Workshop on National Strategic Plan	CNM and partners discussed and determined vision, mission, goals, objectives and strategies for the National Strategic Plan 2021-2025
Oct. 18 - 28	Microplanning Workshop	CNM, WHO and partners brainstormed the activities for the National Strategic Plan 2021-2025
Oct. 25	Malaria Elimination Action Framework (MEAF) narratives initiated	MEAF 2021 – 2015 writing team began compiling data into narrative document
Oct. 29	Microplanning and costing initiated with CNM units	CNM worked with implementing units and key partners to develop the micro-plans for the strategy and initiate the costing
Nov. 18 – Dec. 27	Draft of microplan reviewed	First draft of microplan for MEAF 2021-2025 disseminated within CNM and technical experts for comments and finalization
Dec. 19	Monitoring & Evaluation Framework Workshop	Indicators, baseline and targets for MEAF 2021-2025 discussed with CNM, WHO and partners
Jan. 9	Stratification Results Workshop	CNM presented the results of stratification and received feedbacks from partners to finalize
Jan. 15	Prioritization Meeting	CNM, WHO and partners discussed the priority and strata for each activity in MEAF 2021-2025
Jan. 17	Quantification completed	CNM and partners quantified all commodities in MIS and excel-based tools
Jan. 17	Monitoring & Evaluation Framework for MEAF finalized	Indicators, baseline, and targets for MEAF2021 - 2015 finalized by CNM, WHO and partners
Jan. 24	Draft of MEAF reviewed	MEAF 2021-2025 draft shared by CNM with all partners for comments
Jan. 24	MEAF budget and preliminary gap analysis completed	Based on microplan, unit costs, and existing funding, first version of budget and gap analysis completed







For further information please contact:
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